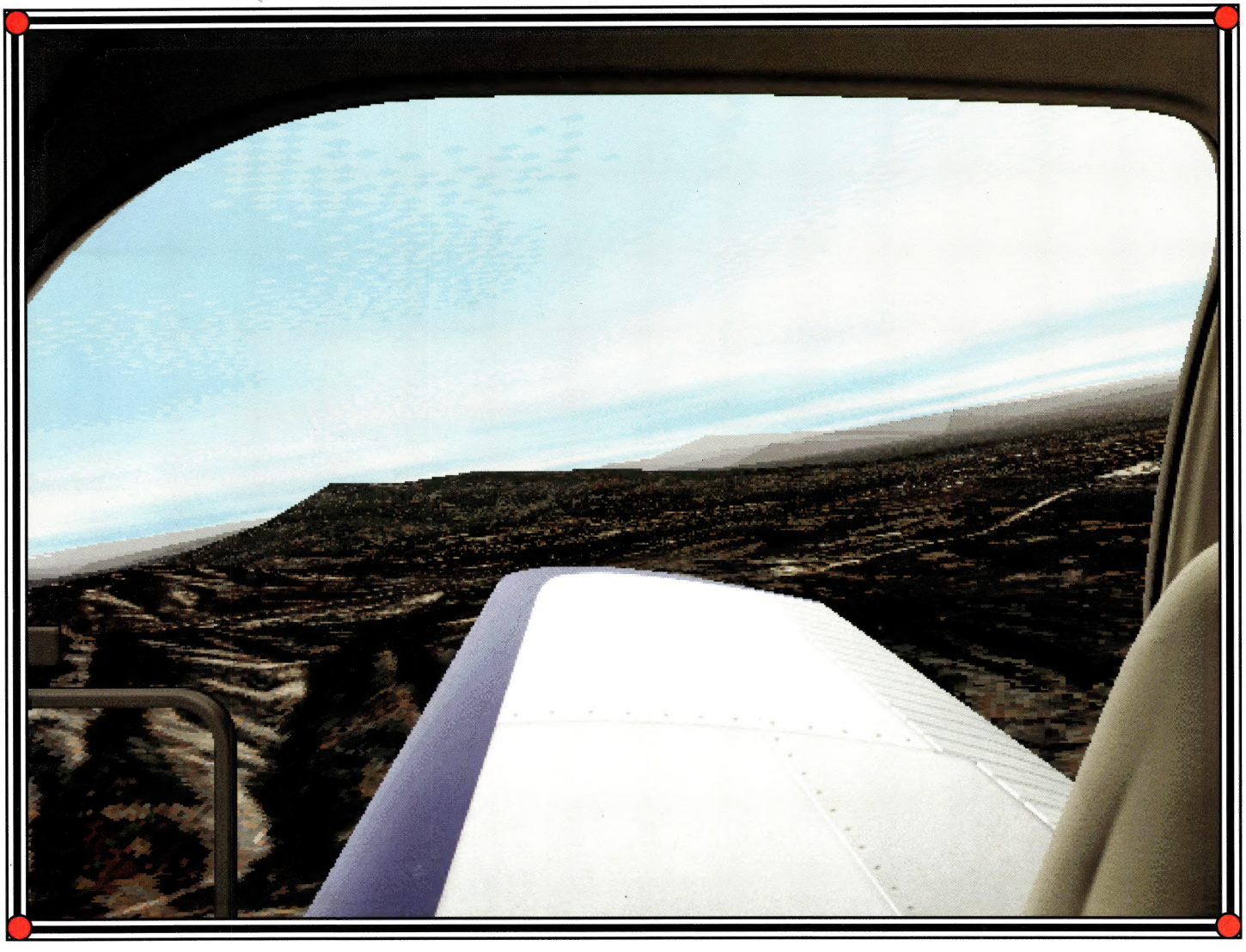
Vol. 5, No. 1

MicroWINGS Magazine

OFFICIAL MAGAZINE OF THE INTERNATIONAL ASSOCIATION FOR AEROSPACE SIMULATIONS



Laminar Research's X-Plane
Building Your Own Cockpit
Microsoft's Southern California
Exploring London in an Ultralight
Short Field Takeoffs and Landings
Round Robin Flying in Norway

Force FX
The new force feedback joystick from CH Products.
You've never felt anything like it. The new Force FX Joystick jolts gameplay into the thrill zone. Feel the true-to-life vibration of revving engines and rough roads. Brace yourself for air turbulence or engine stall buffeting, and hang tough against the vector force in a tight turn. Now, fire off a round and feel it kick back. The Force FX puts the yeehaaahh into flight simulations, driving, space combat and just about any other game. Your palms will sweat. Your knuckles will turn white. You'll swear it's alive.
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MicroWINGS Magazine™

Vol. 5, No. 1

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from the editor

Two years ago, a colleague of mine predicted that before the millennium, desktop PC flight sims would advance beyond the finest full-motion flight sims in terms of flight model fidelity, visual depiction of the outside world (i.e. scenery), and aircraft systems encompassed. I seriously doubted him at the time, but after seeing the flight models in current and beta versions of flight sims, seeing the graphics of FS95 and ProPilot, and the systems encompassed by sims like 747-PS1 (reviewed in the last issue)... I am starting to believe that this could happen in the less than three years remaining until the year 2000. In terms of how fast changes and new features are coming along, for PC vs. Full Motion, PC's are stuck in Fast Forward!

This issue offers plenty of evidence. We have reviews of X-Plane (featuring excellent flight modeling), Airline Simulator (featuring trans Atlantic flight capabilities), Approach Builder (featuring computer generated ATC capabilities), Southern California (featuring scenery rendition capabilities), and AETI's yoke (providing a full-motion quality interface to flight sims). Then, to add icing to the cake, we have more of the popular Build Your Own Cockpit series!

While you contemplate your own opinion on the above prediction, be sure to take some time and enjoy the history that London offers as Crosswinds takes you on an Ultralight flight through the scenery. When you're done, pack some winter clothes and head for Norway where the Virtual Round Robin will guide you through some of the most spectacular snow covered scenery ever seen on a desktop or full-motion simulator. If you run into icing way up north, take a refresher course on short/soft field landings and takeoffs in the Flight School.

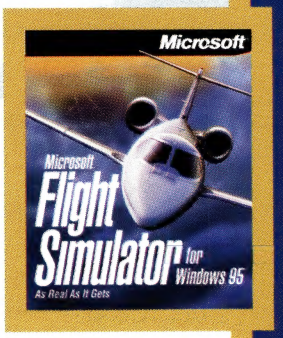
If all the above still has you undecided on the prediction, then turn to page 45 and see what the inside of a Cessna 172, B58 Baron, and V35 Bonanza look like. This issue's Sneak Peeks shows you just how far (down to the buttons on the seats and the rivets on the wings) Sierra's ProPilot is trying to take desktop flight simulation. This issue's cover features a screen shot from ProPilot, taken from the left seat, as the Pilot In Command (PIC) snaps a photo out the right side window.

Before you finish with this issue, be sure to also read the NOTAM's, as we have added, once again, to the list of benefits of being a member of MicroWINGS... ***your*** flight simulation association! *[MW✈]*

KIDS TO ADULTS
K-A
CONTENT RATED BY ESRB

© 1996 Microsoft Corporation. All rights reserved. Microsoft and Windows are registered trademarks and *Where do you want to go today?* is a trademark of Microsoft Corporation. BF Goodrich is a registered trademark of the B.F. Goodrich Company.

Is it a game when your stomach lurches in the course of performing a Cuban eight? Is it a game when beads of sweat appear on your forehead while flying under London's Tower Bridge to digitally sampled sound? No. This is not a game. This is Microsoft® Flight Simulator for Windows® 95, the latest upgrade to the most realistic PC flight simulation available anywhere.



Experienced sim pilots will relish logging time in their new Boeing 737-400 and aerobatic Extra 300S, extending the range of experience beyond the four planes already in the fleet. A heightened level of realistic flight dynamics has been achieved, as verified by Flight Safety International, the world's leading pilot training organization.

Buzz Las Vegas by night and Martha's Vineyard at dawn with a degree of photo-realism that only satellite imaging makes possible. Soar over New York, Paris, Tokyo and other cities with more detailed 3D rendering. Improved performance delivers smoother out-the-window views and more immediate response to cockpit controls.

Challenges have been added to test your skills under daunting weather conditions, over new terrain, in varied aircraft. Fly in the face of Mother Nature as you shoot an instrument approach into the fog. Climb over the Alps through rapidly shifting winds, turbulence and changing visibility. Blow the skirts up on the Statue of Liberty.

To find out even more about Microsoft Flight Simulator for Windows 95, visit our Web site at www.microsoft.com/games/fltsim/

Microsoft®

Where do you want to go today?™

Expansion Pack with southern California scenery, challenges and adventures available soon.

NOTAM'S

News Bits From Around The World

Note - If a company listed below is a commercial member of MicroWINGS, it is a very good indication that you can count on their support of flight simulation users like yourself and for the market. Contact information for commercial members is located in every issue in the Commercial Member Directory.

MW obtains special deal on Discovery Wings CD for members - The benefits of being a member of MicroWINGS continues to grow. In a special arrangement with Discovery Channel Multi-media, members of MW can obtain the fascinating and extremely well made 'Wings Over Europe' multi-media CD-ROM. This excellent CD features more information than you could ever imagine about World War II aviation, strategies, campaigns, and more. Every aircraft involved in the conflict is contained on the CD including pictures, movies, sounds, squadron insignias, you name it! If you don't know what multi-media is all about, then don't hesitate in taking advantage of this latest member benefit. The CD also includes a free bonus 'Aces Over Europe' flight sim (must be run in DOS mode) where you can fly in and fight with just about any of the planes from World War II's European battles. The special benefit is that members can obtain the CD direct from MicroWINGS for just $10 (USA members) or $12 (Int'l members). This price already includes the shipping & handling costs! For more information, call MW at 214-324-1406 or order it directly from our website at www.microwings.com.

New Flight Sim Products Directory on the MW website - Ever wondered if a particular product is made, or where to find a certain yoke, sim, or other add-on? We have too, so now on our website you can find an all-inclusive directory of just about every flight sim product (hardware and software) made. Everything is easy to find with products sorted alphabetically and organized by category. In the directory you can find the product's name, a description, it's category, the sim it is designed for, the manufacturer's name, the manufacturer's telephone number, and the manufacturer's country. For those who do not have access to our website, we can mail a hardcopy (printed) version of the Flight Sim Products Directory for just $3.00 USD. Send in any hardcopy version requests with payment to: MicroWINGS, 381 Casa Linda Plaza #154, Dallas, Texas, 75218, USA.

FSForum heading to London for FI13 - The Flight Simulation Forum will host Fly-In 13 to London-Heathrow, UK, on Sunday, May 4, 1997 at 1:00 p.m. EDT. "Armchair aviators" from all over the world will pilot their Microsoft Flight Simulator v5.1 and v6.0 aircraft from their home airports to Heathrow, in real time, and land under the observation of control tower personnel via a modem or voice telephone connection. After arriving safely at Heathrow, pilots will join an informal conference in FSFORUM conference room 17 to compare notes about their flight, listen to announcements of incoming arrivals, and socialize!

Fly-In 13 Is Coming.....
London-Heathrow, UK
Sunday, May 4, 1997 1:00 PM EDT
See FI13INFO.TXT in FSFORUM Lib 17 (Fly-Ins & Rallies) for details!

Watch the FSFORUM for updates on the adventures of forum staff member Lee James, a.k.a. "Speedbird Niner Delta Victor," who will embark on a 'round-the-world flight to raise funds to benefit the UK-based DreamFlight children's charity. Lee will depart from LHR in his nearly-famous simulated British Airways 747-400 one week before the Fly-In, and visit 35 FS scenery airports in 29 countries before returning to Heathrow for a landing during the Fly-In. Lee will upload regular reports and FS flight photographs to the FSFORUM so everybody can follow along with his journey. Further information regarding DreamFlight, an organization which provides trips to Disney World for terminally-ill children, will be available in the Fly-In registration materials.

This Fly-In will feature superb scenery for London-Heathrow designed by Holger Schmidt, with special enhancements by Rush Mueller, Jim "J.C." Crummy, and John Mooney (a preview photo is available in Library 17 as FLYIN13.GIF.) FS5/FSFS and FS6-compatible adventure modules developed with the assistance of MicroWINGS, Inc. President Robert MacKay will give incoming pilots real-time ATC instructions to the airport. Registration materials will be available in FSFORUM Library 17 (Fly-Ins & Rallies) shortly. Watch the FSFORUM during the coming weeks for further details!

Sierra puts up ProPilot web page - Sierra has now posted a page on their website with information on ProPilot as well as a library full of screen shots from this new sim due out in July. Sierra has gone an extra step in also allowing visitors to their website to sign up for an email based ProPilot news/update program. When ever the ProPilot web site gets new information or screen shots posted, Sierra will let these people know about the updates via email. Sierra also promises to let you in on exclusive offers to buy at unadvertised prices. The page can be reached by using the address: http://www.sierra.com/entertainment/pilot/index.html.

Technic Direct to release great collection of Aircraft and Panels for both FS5.1 and FS6 - The follow-on to Technic's first aircraft collection, High Quality Aircraft Collection 2 (HQAC-2) will feature brand new panels for FS5 (B-727/100, B-727/200, B-747/100, B-747/200, B737 [updated from HQAC-1], Fokker VII Classic panel, Twin panel) and modified panels for FS6 (B-707, B-727, B-737, B-747, B-757, B767, B-777).

There are also 12 High Quality aircraft in 50 variations (colors and airline markings) to expand your aircraft library. To help users get off the ground quicker, there is now a multimedia application for learning to fly with the new panels (such at the B747/200 with dump-valves, fuel management, new AutoPilot, radar altimeter, fully functional overhead panel, etc.). The handbook is now also included on the CD as a Microsoft Word file (if you do not have MS Word, a viewer program to allow you to see the file's contents is also included).

CH Products sponsors Air Combat Tournament - Fighter Pilots USA and CH Products have teamed to bring the "When Failure Is Not An Option" Air Combat Tournament, being held April 30-May 3. This 3-day tournament is the ultimate 1-vs.-1 event to take place at the 62nd Fighter Squadron in Kissimmee, Florida. Participants will fly 1-4 sorties in a real SF260 Marchetti. To determine the true "Top Gun", the single elimination tournament will be scored according to USAF Fighter Weapons School standards.

Computer simulation has been added to the ground school briefings to visually educate the "Guest Pilot" to basic air combat maneuvers. A computer aerial simulator instructor will be on-hand to instruct the ground school competition during the event. ICI's Warbirds simulation software will challenge the pilots during the computer duel competition using throttles, joysticks, and rudder pedals provided by CH Products.

The winner of the combat competition will receive an orientation flight in the P-51 Mustang "Crazy Horse" (one of only five dual-control Mustangs remaining in the world today). Other finalists will take home hand-finished lambskin leather Flight Jackets, trophies, and the F-16 Combatstick and Pro Throttle from CH Products. *[MW✈]*

MicroWINGS Magazine

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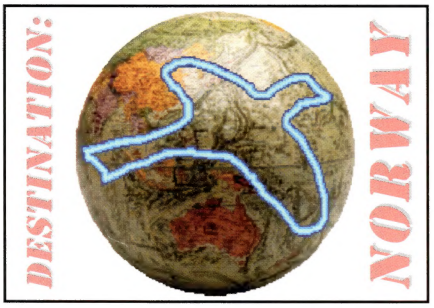
MicroWINGS Drawing Winners!

The Jan/Feb Drawing Winners Are:

Jose Guerrero of Venezuela has Colorado Technologies' *Navigator* on its way to him. Congratulations!

Ben Heaton of San Diego, CA has BAO's *Flight Sim Flight Shop CD* on its way to him. Congratulations!



Virtual Round Robins

The term Round Robin is used by many aircrews to describe a flight route that completes a circuit (ends where it begins). Normally, a practice approach is flown at each airfield on the route.

by Al Pelletier

Hi Flight-Simmers, welcome to this issue's Round Robin (RR). This RR takes place in Norway and was flown with Microsoft FS6 (a.k.a. FS95). It can be flown with any Flight Sim that has the required airports and navaids. The RR's use "real" world navigation.

Scenery

This RR was done using Microsoft Default FS6, and NORWAY6.ZIP (or newer) by Svein Holbo, Bengt Larsson, and Arne Sundsbo. This scenery is one of the finest available and the winter scenes are awesome. It can be downloaded from the MW web site or ordered from MW (see the Pilot Shop column for how to order files). I flew Michael Oxner / Eric Mitchell's DASH 8 on this trip (which is flown best with a commuter type of aircraft). If you did previous RR's, skip the next paragraph, jump right in, and have fun.

For those who are new to this, Round Robins are published with the intent of having Flight-Simmers fly, look at the scenery, refresh (or even learn) our Geography, practice our cross country navigation , do some approaches at different airports all over the world, and have some **fun**!

Waypoint	ID / Freq	Elev	Position	To Next Waypoint: Course	Distance	Comments
Stavanger Sola airport		30	N 58° 52.9' E 5° 38.0'	146T 143M	56.2 nm	VOR SOL 114.20
Lista VOR-DME	LST 109.30	49	N 58° 06.1' E 6° 37.6'	133T 130M	2.6 nm 56.2 nm	
Lista NDB	LST 309	3	N 58° 04.3' E 6° 41.2'	312T 309M	2.6 nm 58.8 nm	
Lista airport		33	N 58° 06.0' E 6° 37.5'	091T 088M	40.7 nm 61.5 nm	VOR LST 109.30
Svensheia VOR-DME	SVA 112.10	394	N 58° 05.1' E 7° 54.5'	040T 037M	4.3 nm 102.2 nm	
Odderoy NDB	ODR 372	7	N 58° 08.4' E 7° 59.8'	036T 033M	4.9 nm 106.5 nm	
Kristiansand Kjevik airport		56	N 58° 12.4' E 8° 05.3'	048T 045M	89.8 nm 111.4 nm	
Torp VOR-DME	TRP 108.30	295	N 59° 11.4' E 10° 15.7'	053T 050M	19.3 nm 201.3 nm	
Rygge VOR-DME	RYG 113.50	197	N 59° 22.9' E 10° 46.0'	099T 096M	0.6 nm 220.5 nm	
Rygge airport		180	N 59° 22.8' E 10° 47.2'	257T 254M	18.9 nm 221.2 nm	VOR RYG 113.50
Tune NDB	RY 381	3	N 59° 18.5' E 10° 11.1'	263T 260M	18.8 nm 240.1 nm	
Myra NDB	MR 389	3	N 59° 16.1' E 9° 34.5'	266T 263M	83.1 nm 258.9 nm	
Lyse VOR-DME	LSY 114.10	2953	N 59° 08.0' E 6° 52.9'	270T 267M	38.1 nm 342.1 nm	
Rennesoy NDB	RSY 378	33	N 59° 07.9' E 5° 38.7'	181T 178M	10.4 nm 380.1 nm	
Sola NDB	ZO 352	30	N 58° 57.5' E 5° 38.3'	182T 179M	4.6 nm 390.5 nm	
Stavanger Sola airport		30	N 58° 52.9' E 5° 38.0'		395.2 nm	VOR SOL 114.20

Figure RR.1 - Our Flight Plan for this round robin, using NavAid v1.2.

In the RR messages, you will be getting information like: airport departure and runway number , VOR's and ADF's enroute, two or three middle airport destinations for VFR or Instrument (INST) approach, and then back to your point of departure (making a complete round robin) for an INST or VFR approach, along with ILS and Localizer Outer Marker (LOM) freqs (these are also NDB's), minimums, procedures, etc. You will also get information on the scenery needed to complete the flight and where to get it. Also, who created the scenery (for non-commercial sceneries) and a little background on the geography of the area.

May I also suggest, that you read the route over a couple of times before starting out, so that you'll have the flight plan fairly clear in your mind.

Figure RR.2 - Ready to land at Stavanger.

STAVANGER (Sola airport) ➢
FARSUND (Lista airport) ➢
KRISTIANSAND (Kjevik airport) ➢
MOSS, (Rygge airport) ➢
STAVANGER

BEGIN

First leg:
SOLA ➢ LISTA
approx. distance 57 NM.

- Clock 12:30.
- Under airports, select Stavanger.
- Dial in the LISTA (LST) VOR 109.30, and the LISTA (LST) NDB 309.

- Taxi to and Take Off (T/O) RUNWAY (RWY) 18. Left climbing to 9000, HDG 140. Track the LST VOR. 15 NM out of the VOR, descend to 5000 and reduce to approach speed.
- On top the VOR, continue descent to 2000 and home the LST NDB to on top. Continue past the NDB for 1 minute then make a 180 and home the NDB again. On top, turn HDG 320 and continue until visual with RWY 32.
- You are cleared for a full stop RWY 32, check gear down.
- Land LISTA airport.

Second leg:
LISTA airport ➢
KRISTIANSAND KJEVIK airport.
approx. 40 NM

- Clock 13:15.
- Dial in the SVENSHEIA (SVA) VOR 112.10 on NAV2, the CN LOC 110.30 on NAV 1, and the Odderoy (ODR) NDB/LOM 372.
- Taxi to and T/O RWY 14, climb RWY HDG to 2000, then turn left and track the SVA VOR and continue climbing to 5000.
- 15 NM out of the SVA, descend to 3500. Standby to intercept the LOC near or on top the SVA VOR in preparation for an ILS to RWY 04 at KJEVIK (actual course 037, altitude 35 ft, RWY length 6135).
Note on the actual course: I found that for the purpose of this flight, 040 worked better than the published 037.
- Intercept the LOC.
- You are cleared for a full stop to RYW04, check gear down.

Figure RR.3 - The CAF DASH on final at Kristiansian.

NOTE: If you have some time, I strongly recommend a little VFR flight around Kristiansand, like maybe a few right hand circuits for RWY 04. The scenery is well worth it!

- LAND Kristiansand, Moss, Kjevik airport.

Third Leg:
KJEVIK airport ➢
RYGGE Airport
approx. 152nm

- Clock 14:20.
- Edit weather to:
User Defined
Clouds 7/8 Coverage
Base 2,000 - Tops 10,000
Wind 345° at 20Kts.
Visibility 5 NM
- Dial in the TORP (TRP) VOR 108.30.
- Taxi to and T/O RWY 04, climb to 11000, HDG 045. Track the TRP VOR to on top. (It will kick in approx. 35 NM out of Kjevik).
- On top TRP, Begin descent to 3500, dial in and Track the RYGGE (RYG) VOR 113.5.
- Enroute RYG, Dial in the RY LOC 109.1 in preparation for an ILS to RWY 30 (actual course 299, elevation 180, RWY length 8000).
- On top RYG, continue descent to 3000, and turn heading 093 until 9

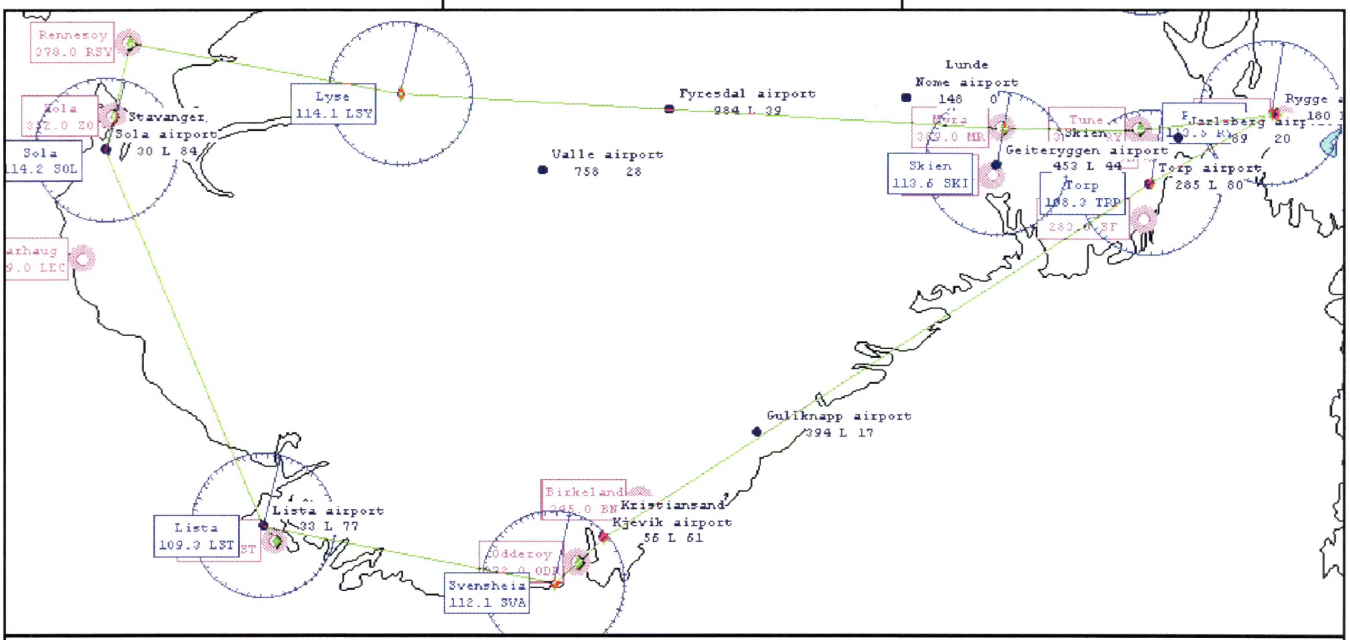


Figure RR.4 - A map of our round robin flight through Norway.

NM out past the VOR. Then turn right HDG 260 and intercept the LOC.

- 5 NM back, you are cleared for a full stop to RWY 30, check gear down.
- LAND MOSS RYGGE Airport.

Fourth leg:

MOSS, (Rygge airport) ➢ STAVANGER, (Sola airport) approx. 160 NM.

Figure RR.5 - Kristiansand at dawn, typical of the beautiful Norway scenery.

- Clock 15:00, WINTER.
- Edit Weather to Clear, Unlimited Visibility, and light winds.
- Dial in the Tune (RY) NDB 381.
- Taxi to and T/O RWY 30, left climbing to 17000, HDG 260. Home the RY NDB.
- On top RY, dial in and home the MYRA (MR) NDB 389 to on top.
- On top MYRA, turn HDG 263 and dial in the LYSE (LSY) VOR 114.10, and upon reception, track to on top.
- Enroute LSY, dial in the Rennesoy (RSY) NDB 378 and the LOC (ZV) 110.3 in preparation for an ILS at Stavanger's Sola airport RWY 18 (actual course 182, elevation 29, RWY length 8383).

NOTE: This approach is offset by 3 degrees from the actual RWY magnetic heading.

- Over LSY, begin descent to 4800, and home the RSY NDB. (you'll have about a 35 NM run, past the LSY VOR before you get to the RSY NDB and intercept the LOC).
- Intercept the LOC.
- You are cleared for a full stop to RWY 18, check gear down.
- LAND SOLA.
- WELCOME HOME

GEOGRAPHY

Stavanger Sola Airport: This is a modern airport with new terminals and hangars. There is also a small aviation museum for aircraft from WW II up to the mid 1960's – about 25 aircraft, mostly props and jets from the Norwegian Air Force from this period.

Farsund Lista: A small town of about 10,000 inhabitants. The hometown of very large shipping companies with tankers and bulk carriers steaming around the world. Lista has one of Norway's largest aluminum plants and lots of fish-canning industries.

Kristiansand: The capital of "Soerlandet" (the name of the southernmost part of Norway). The city has 65,000 inhabitants. It was founded 1641 as a military base for King Christian IV of Norway/Denmark. Today it is a center of commerce, trade, and administration. Kristiansand's old town has a very picturesque architecture with lots of treed buildings.

At Kjevik Airport, the Norwegian Air Force has its technical training center and the Air Force branch of the Norwegian Military Academy as well. When approaching Kjevik Airport from the south you'll pass the Varodd Bridge which is a kind of landmark in Kristiansand.

Moss, Rygge: Is an industry town in the Oslofjord, 55-60 km south of the Norwegian capital Oslo. It has 25,000 inhabitants and was founded 1560. Rygge Airport is a military airport only and was built in 1952-53. The Air Force base is the main base for the south-eastern part of Norway, with F-16 military fighters. The runway is 2440m concrete.

The above was written by *Svein Holbo* of Tromso, Norway.

Thank you to Chris Squire for test flying the route. Thanks also to Peter Jacobson for the program NAVAID11 and to Ted Wright for NAV16, which were used for the flight plans and maps.

For the experienced flyers, please be patient through all of the explanations, directions and extras. In order to address newcomers as well as seasoned virtual pilots, I must stick to plain language. Have Fun!

About the author - Al Pelletier served in the RCAF for 25 years, as aircrew on Maritime Patrol airplanes. Al has been flying Flight Sims since the mid 80's with MSFS V2.0 and is a member of the Comox Valley Stopover Flyers. Al can be reached via Internet email at apeltier@mars.ark.com. [MW✈]

FLY TIPS

Course Reversal

90-270 method

You've just passed over a navigation aid and want to turn around and return on the same radial. If you do a simple 180 you will be displaced from the desired radial by 2 times the turn radius (at 200 knots that's 2 nm). A reliable method of turning back is to do a stable (constant speed, altitude, and bank angle) turn for 90 degrees then immediately doing a stable turn in the opposite direction for 270 degrees. ***[MW✈]***

FLIGHT SCHOOL

SHORT & SOFT-FIELD TAKEOFF & LANDINGS

The INTERNET report read...

PLANE CRASH MISSES SHOPPING CENTER

November 5, 1996 — A small plane (C-172) lost power and came down next to a shopping-center parking lot Tuesday morning. It crashed into a grove of trees at the end of the lot at the Sam's Warehouse. The pilot tried to land in the parking lot, but didn't have enough room. He walked away unhurt.

But for one eye witness and others in the parking lot when the plane came barreling in, it was a scary morning, indeed. "I was sitting in my car," said one lady, "and I thought his wings were going to start clipping the tops of our cars. Then I thought he'd hit the trailers over there. It looked like he was really trying to miss them. Thank God he missed them and went right into the trees." Police say the pilot reported he was having a power problem. He ended up less than a half mile short of the runway at the Grand Prairie, TX airport.

I can't help wondering... did the pilot utilize any sort of a short-field landing technique or just do the best he could to get the plane down and survive without harming anyone on the ground? Did he control his airspeed to the slowest speed possible? Did he use full flaps? What you do in an emergency situation will be determined by a variety of different factors: available altitude, day, night, partial power loss, fire... the list goes on. However, the one factor that could determine the best possible outcome, in my opinion, is the pilot's proficiency and preparedness for that unexpected takeoff or landing that is anything but routine.

This particular lesson is intended to help you understand the difference between a routine takeoff and landing and a more demanding procedure that will require precise speed and aircraft control. The name of the game is **procedure**. This is the wonderful thing about our flight simulation. We can get the procedure down and then put it into actual practice back at the local airport. **Soft-field** takeoffs and landings are a little harder to practice since we don't really want to take the risk of damaging the airplane in the mud. However, we can still simulate the procedure in the grass or hard-surface runway and reach a fair degree of proficiency at transferring the weight of the airplane from the nose wheel, to the main gear, and then to the wings, in order obtain ground effect as soon as possible. **Short-field** takeoffs and landings will be just as demanding and require total concentration on airspeed and pitch control (which are really one and the same).

There are a great deal of other considerations that a pilot must be aware of that can effect the final outcome of any takeoff or landing. To name a few: density altitude, wind direction/speed, weight of the airplane, aerodynamics of the aircraft itself, condition and gradient of the surface the takeoff/landing is to take place on, runway length, tire inflation, tire size, degree of brake pressure used, available engine power, and again... the list goes on. We are going to concentrate on procedure more than anything else. Once you have practice the steps involved with these takeoffs and landings and feel comfortable with the execution of each, you will need to expand on that knowledge by considering how all the other variable conditions will affect the airplane's performance. Obviously, a strong headwind will reduce the touch-down speed and roll-out of any landing. A heavy airplane will descend faster. Greater brake pressure will reduce the landing roll. You get the picture.

CLIMB RATE

Even though the main objective is to safely become airborne when taking off from a short or soft-field, there is always the possibility an obstruction of some nature may exist close enough to the departure end of the runway to present itself as a challenge to the pilot during climb out. It is not uncommon to find powerlines, trees, towers, and buildings directly in the climb-path after takeoff. Normally a large airliner will liftoff and climb at very strict and calculated airspeeds. Most small airplane pilots will climb at a speed that provides the best engine cooling and for-

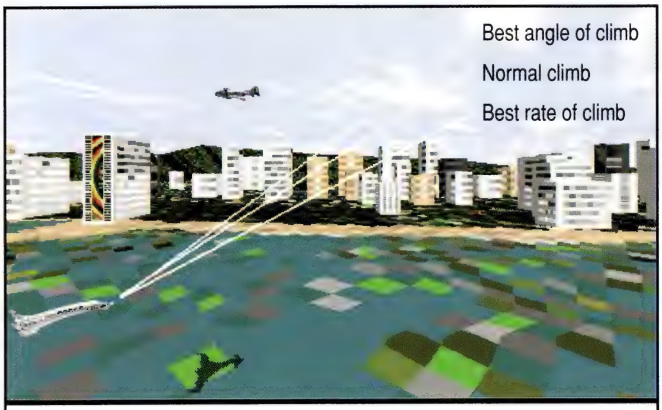


Figure FS.1 - Compare the best angle, normal, and rate angles of climb.

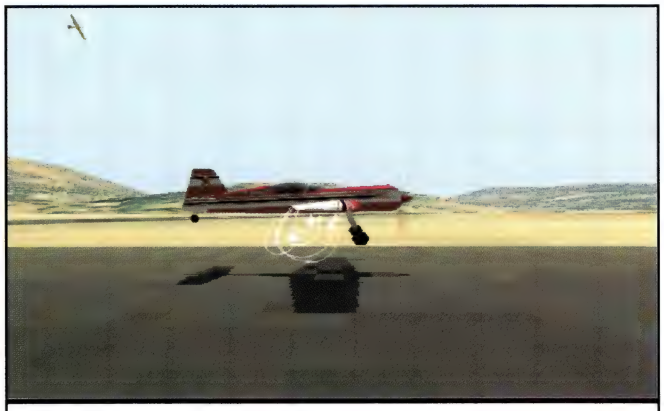


Figure FS.2 - When the airplane wing operates within a wingspan distance above the ground, induced drag is significantly reduced.

ward visibility. If an obstacle exists, a specific rate of climb will need to be calculated to assure the pilot that the object will be cleared.

Performance charts will provide the pilot with a great deal of information the manufacturer has gathered from test flights and published for the benefit of those who will be using their product. Not only is this information required by law, but pilots are required by FAA regulations to be familiar with the required takeoff and landing distance for each operation conducted. A Takeoff Distance Chart will provide ground roll distance for normal takeoff as well as the distance required to clear a 50 ft. obstacle. A Climb Data Chart should be studied to better understand how different altitudes, temperatures and other variable conditions will affect performance. A Landing Distance Chart is also a good source of information to better understand how the particular aircraft being flown will perform under given conditions.

We will practice clearing a 50 ft. (20 meters) obstacle after takeoff and in each case will lift-off and climb at the best **angle**-of-climb speed. This is defined as the speed which will provide the greatest gain in altitude over a given distance. Most often this speed is used immediately after takeoff to clear obstacles that may be at the end of the runway. The best angle-of-climb speed requires greater power and reduces rate of climb since the wings are at a high angle of attack and are producing greater drag.

The best **rate**-of-climb speed provides the greatest gain in altitude per unit of time. The angle of attack employed in the best rate-of-climb speed is usually an angle that provides the greatest ratio of lift to drag. Therefore, this speed provides the greatest climb coupled with the minimum drag. This speed is normally used during the climb after all obstacles have been cleared and is usually maintained until leaving the traffic pattern. Best rate-of-climb speed is also useful when a climb over higher terrain is required since this speed will allow the pilot to climb to a terrain clearance altitude in the shortest period of time. (Fig. FS.1)

Again remember, we are practicing maximum performance takeoffs and landings. Many manufacturers designate a cruise climb speed to be used for cross-country flights and may be as much as 10 to 30 knots faster than the recommended best rate or normal climb speed. A cruise climb speed is normally at 75% power and an airspeed that provides good engine cooling and a low enough angle of attack to provide good visibility during climb. The lower angle also contributes to passenger comfort.

GROUND EFFECT

Eventually, I will mention ground effect, so let's touch on the subject briefly. Ground effect is a condition that occurs when the airplane wing operates within a certain distance of the ground and the downwash characteristics are altered with a resulting decrease in the induced drag. When the airplane is close to the ground the strength of the vortices is decreased and the downwash angle is also decreased for a particular amount of **lift** being produced. This means the wing's true lift and the effective lift are working closer to each other and the retarding force is less. It's a little like riding on a cushion of air. (Fig. FS.2)

All other things equal, the low wing airplane is more affected than the mid- or high-wing airplane because the wing is closer to the ground. Drag can possibly drop as much as 48% in ground effect. This amount of drag decrease could fool a pilot into a premature climb on takeoff or extend the landing distance beyond what was expected. The pilot's misunderstanding of ground effect has caused more than one landing accident when the plane has "floated" the length of the runway while the pilot patiently waited for the airspeed to bleed off. You can use ground effect to aid in acceleration to climb speed after takeoff, as we will find out when practicing soft-field takeoffs.

SOFT-FIELD TAKEOFF

I have yet to figure out why most smaller airplane Information Manuals don't have a soft-field takeoff checklist procedure. Maybe it's because the manufacturer doesn't recommend you get yourself in a situation where you need to takeoff from a muddy field. High grass, snow, rough fields, or a sandy beach may also qualify as a soft field. True, you should avoid this situation because the risk of damage to the airplane is higher. Most fixed base operator's who rent airplanes will absolutely restrict the airplane to approved hard-surface runways. It is also not unusual for airplane insurance companies to enforce this same policy.

In our case, there are no restrictions to practicing soft-field takeoffs on the simulator other than no actual soft-field conditions having been programmed into MS-Flight Simulator or any other software I own. How about some of you do-it-yourself programmers working on this option? I'm sure most of you have figured out by now you can even takeoff and land on most areas of water, as if the computer doesn't know the difference. If you have ever been stuck in the mud in your car, you've probably found out that once underway you don't stop until completely out. You will continue to use the forward momentum to get clear of the situation, avoiding turns as much as possible. The same is true when simulating a soft-field takeoff.

This flight lesson will be conducted in the MS-Skylane RG182. On the simulator, we usually start from a takeoff position at the end of the runway, but in real life during a lesson, we start from the taxiway. The first action after run-up is to set the flaps for takeoff. If you look hard enough you may find something about soft-field takeoffs in the airplane's Information Manual. In the Skylane RG182 manual, under Amplified Procedures, Takeoff - wing flap settings; you will find one paragraph that reads, *"Soft-field takeoffs are performed with 20 degrees flaps by lifting the airplane off the ground as soon as practical in a slightly tail-low attitude. If no obstacles are ahead, the airplane should be leveled off immediately to accelerate to a safe climb speed."*

With this is mind, set the flaps to 20 degrees. Pull the yoke (stick) back as much as possible and apply enough power to break free of the soft-field condition, if actually in a soft field. If you're taking the runway from the taxiway, apply enough power to taxi into position, line-up with the centerline of the runway

and apply full power, all without ever stopping. On our simulator, if this is the first takeoff, you're probably already at the end of the runway ready to go. Set the flaps, apply full back pressure on the elevator (joystick) and apply full power.

The first objective is to raise the nose wheel off of the (simulated) soft surface to reduce the drag it is having on the takeoff run. The prop-wash over the tail section will help bring the tail down/nose up and in turn raise the nose wheel off the runway surface. Remember, when the nose wheel comes off the ground the directional control will depend upon the rudder alone. Torque and P-factor will be trying its best to pull the plane to the left, so stay on top of what's going on and maintain directional control with right rudder. Things get very critical as the second objective begins to take place, transferring the airplane's weight from the main gear to the wings as rapidly as possible. As the airplane begins to lift off, you will need to (very precisely) decrease the pitch attitude and maintain ground effect. The airspeed at this point is normally the slowest speed at which we can maintain level flight, in ground effect only. A climb at this low airspeed may result in a stall if we extend beyond ground effect. Therefore, maintain this altitude just above the ground until reaching 55 KIAS, the best angle-of-climb speed. At sea level this speed will be 64 KIAS (flaps/gear-up) under standard conditions. This is 64 knots **indicated airspeed** (IAS). With 20 degrees of flaps applied, this airspeed decreases to 55 KIAS according to the C-182RG Information Manual. If this were a check-ride for a private pilot's license, the acceptable range is between +10/-5 knots. A good speed to shoot for is 60 KIAS to allow a safe margin on both sides. If the inspector doesn't ask you to clear a 50 ft. obstacle, then takeoff and climb at the best rate-of-climb speed 88 KIAS (flaps/gear-up) +10/-5 knots.

If this were the real thing, you could safely, with very little margin for error, break ground and climb at 45 to 50 KIAS, depending on your gross weight and other variable conditions. At 55 KIAS, begin a climb until you have reached an altitude just beyond 50 feet above ground level (AGL). Remember the obstacle you're attempting to clear? Decrease the pitch attitude to increase the airspeed and raise the landing gear. At 75 KIAS, slowly retract the wing flaps to the full-up position. Climb to pattern altitude at the best-rate-of-climb speed 88 KIAS (flight-test) or 80 KIAS for a normal climb. When practicing takeoffs and landings, it's not necessary to raise the landing gear after every takeoff. The choice is yours. Also remember, some IAS's can vary with different conditions. By now you probably understand the variables involved with these IAS's. There is a range of acceptable speeds and which one you use will depend on whether you are conducting the real thing, a flight test, or just practice. Continue to climb straight ahead to 500 ft. AGL, turn downwind, and level off at pattern altitude. Now let's get setup for a soft-field landing.

What may surprise you is how difficult this maneuver is at first in a real airplane and just how fast things happen. Even the simulator will help you to understand the degree of forward pressure necessary to stay in ground effect and not begin a low-airspeed climb. The nose will raise off the ground at an unbelievable slow groundspeed. The amount of right rudder necessary to counter the torque and P-factor is an eye-opener and the extremely slow airspeed at which the airplane is able to fly in ground effect may come as a surprise. The plane will accelerate very quickly, in ground effect, and the extremely high angle of attack necessary to maintain 55 KIAS climb always made me a little nervous so close to the ground. Believe it or not, most of this maneuver requires your eyes to actually spend more time inside the cockpit watching the airspeed and altimeter indications than the runway ahead. A skillful feel for control pressures and a good scan of the instruments are essential for a good soft-field takeoff.

SOFT-FIELD LANDING

The best information we can obtain concerning a soft-field land-

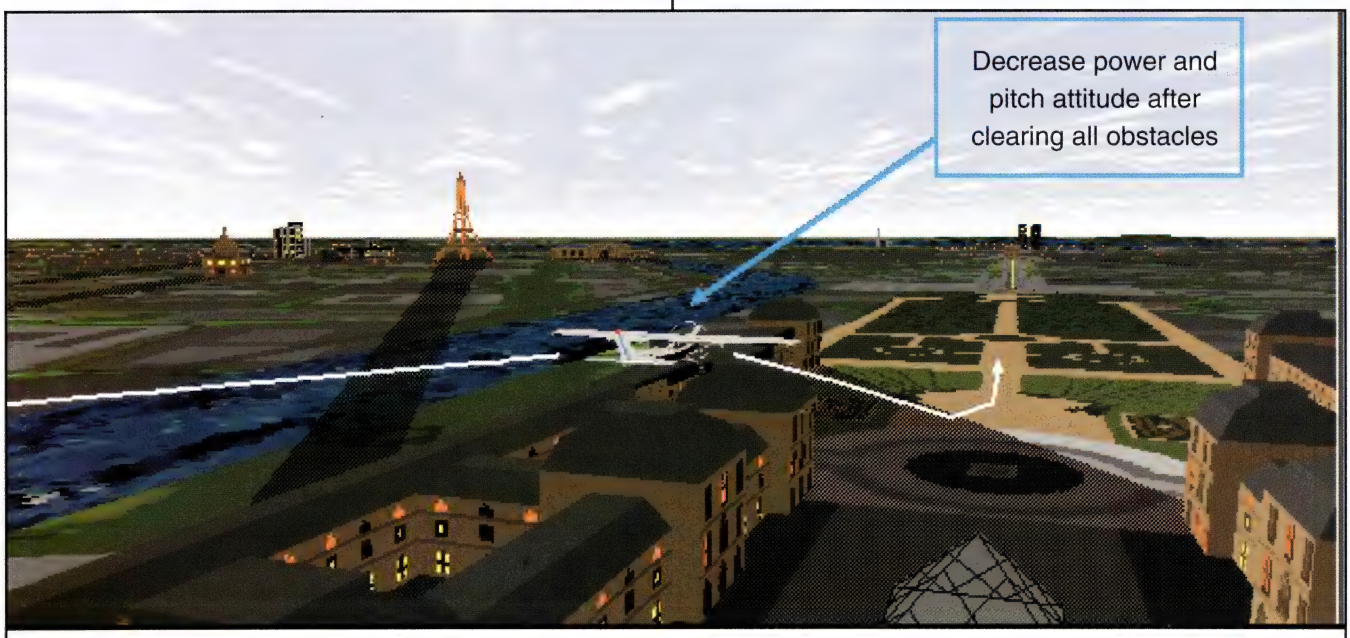


Figure FS.3 - Leave just enough power for rudder effectiveness while trading off altitude for airspeed during a simulated soft-field landing.

ing from the C182RG Information Manual is probably found under, Emergency Procedures. Unless someone has talked you into landing at their private strip that may or may not have been properly maintained or a deer-lease location that was fine for landing several years ago, you probably won't be making any actual soft-field landings except under an emergency situation. There are many variables that we could discuss for hours on emergency landings but I'd like to stick close to the soft-field landing that is required by regulations according to the Private Pilot Practical Test Standard (PTS). I know we haven't discussed this extremely important FAA guide, but I personally refer to it, as most instructors do, as the most reliable source for requirements the FAA will expect from an applicant for any practical test towards a certificate.

According to the C182RG Information Manual the recommended approach speed is 65 KIAS with full flaps (on final approach) for a forced landing. The PTS requires the applicant to establish the recommended approach and landing configuration, airspeed, and adjust pitch attitude and power as required. Maintain a stabilized approach and the recommended airspeed, or in its absence not more than 1.3 Vso +10/-5 knots, with gust factor applied. The bottom of the white arc on the airspeed indicator is (Vso) = 37 knots. This is the stall speed with full flaps or the minimum controllable airspeed in landing configuration. 1.3 x 37 = 48.1 knots. If we apply the +10/-5 knot acceptable range, we should maintain an approach speed between 43.1 and 58.1 KIAS, or to make it simple to remember, between 43 and 58 KIAS. However, the recommended approach speed for a soft-field landing is 65 KIAS. Therefore, the proper approach speed should be between 60 and 75 KIAS for a flight test. If this raises the question in your mind as to why the performance specifications in the MS-FS Handbook and program itself say the full-flap stall speed is 50 knots, let me briefly explain. I am talking Vso-37 knots indicated airspeed (IAS). The specifications that say 50 knots are talking calibrated airspeed (CAS). Calibrated airspeed is the IAS speed, corrected for instrument and installation error. Climb to an appropriate altitude, drop the gear, extend full-flaps, and see what the airspeed reading is when the stall indicator comes on while performing a normal power-off stall.

With the proper pitch attitude, the airplane won't actually start to stall until we reach just below 37 KIAS. So in a **real** emergency landing, what speed would you actually use? That would really depend on all those things we could spend hours talking about. The degree of skill and knowledge the individual pilot possesses about him/herself and the airplane involved will determine the true answer. During the NTSB investigation, will the landing gear be up or down? Flap control in the up/down position? Propeller feathered? Fuel selector in the off position? Can you get some idea of the various conditions that a pilot must consider when presented with what may be the most stressful emotional event in her/his life? That's why, as a pilot, you would find it to your advantage to practice maximum performance maneuvers under controlled conditions such as these (PC-simulation), to better understand the variables and be proficient at the recommended procedures. When you fly on a major airliner, you would expect the pilots to be the best they can be and so do the non-pilots (your passengers) when they go up with you in the airplane you're flying.

Get lined up on final approach to the runway and stabilize your approach speed at 65 KIAS. Under normal circumstances we would have already gone through the landing checklist. While still on the downwind leg we made sure the fuel selector valve was on both tanks, landing gear-**down**, mixture-**rich**, carburetor heat-**on**, propeller-**high RPM**, autopilot-**off**. Also, the flaps should be positioned to 10 degrees on downwind, 20 on base, and (40)-full flaps after the airplane has been stabilized on final to the approach speed. This is not a simulated emergency landing and we will be able to use whatever power setting is necessary to maintain the proper airspeed. A higher than normal power setting is not unusual due to the amount of drag the full-flap condition creates. Try to maintain an altitude of 60-65 feet AGL until just over the end of the runway. Did you forget about that 50 ft. obstacle again? There will almost always be an imaginary 50 ft. obstacle to clear on the private pilot check ride and should be practiced as such. There's nothing wrong with practicing with and without an obstacle to clear, just don't forget about it on the check ride if the flight inspector informs you that one exists (Fig FS.3).

One good thing about the soft-field landing, on a check-ride anyway, is that distance is not a real concern. The touch down is the main consideration. The objective here is to simulate a landing on a surface that could cause the airplane to come to an abrupt stop, nose over or slide right off the intended landing area and into an object not forgiving of impact. Imagine yourself landing in the mud. You want to place the main-gear ever so gently in the mud, allowing it to slow the plane down until the wings just can't support the weight of the airplane anymore. Leave the power setting at a level high enough to provide the rudder with directional control and forward momentum. Remember the soft-field takeoff? We are going to simply reverse the procedure we used then. Land on the main gear as gently as possible, maintain full aft elevator after touch-down and hold the nose wheel off as long as possible. As the nose wheel settles to the surface, continue to hold the yoke (stick) all the way back and reduce power. Don't close the throttle completely but leave just a hint of power. Don't raise the flaps, but taxi off the runway as if you were simulating the need to maintain control with the power/rudder and momentum to clear the landing area. Once off of the runway, relax and taxi back for a short-field takeoff.

SHORT-FIELD TAKEOFF

After completing the before takeoff checklist, safely taxi onto the runway as close as possible to the end. Naturally, if you were faced with an actual short-field takeoff you would want to utilize as much space as possible. The short-field takeoff checklist (C182RG) reads as follows: Wing flaps-**20 degrees**, carburetor heat-**cold**, brakes-**apply**, power-**full throttle and 2,400 RPM**, brakes-**release**, elevator control-**maintain slightly tail-low attitude**, climb speed-**55 KIAS until obstacles are cleared**, landing gear-**retract after obstacles are cleared**, and wing flaps-**retract slowly after reaching 75 KIAS**.

We can modify the procedure just a little, for instruction, without taking away from the original procedure. Make sure the trim is set in the neutral position. Align the airplane up with the centerline of the runway, apply the brakes, and add full power. We are practicing this with a no wind, or a wind straight down the runway condition, and I'd like you to not touch the yoke (stick), at all, after full power has been applied. We want to accelerate as fast as possible with as little drag on the airplane as possible. When the engine has reached full power, release the brakes. The ailerons, elevator, and rudder will all take a neutral position and drag will be at its lowest level. Right rudder, actually controlling the nose-wheel at this point, will be necessary to control our path down the centerline of the runway until the best angle-of-climb speed is reached.

Unlike the soft-field takeoff, we want to hold the airplane on the ground until the very moment we reach 55 KIAS. A little forward pressure may be necessary as the groundspeed increases and the airplane tries to lift off. Let's go ahead and practice the real thing using the slowest allowed IAS of 55 KIAS. At this speed, you will actually be conducting a low level, instrument type takeoff. Your eyes should be shifting between the airspeed indicator and the altimeter. It may take more back pressure to lift off and maintain 55 KIAS than you expect. The airspeed is controlled by the pitch attitude and you're going to concentrate on maintaining 55 KIAS +10/-5 knots, until reaching 50 ft. (20 meters) AGL. Now lower the pitch attitude to 75 KIAS and begin to clean up (raise flaps and the landing gear) the airplane for climb to pattern altitude. Allow the airspeed to increase to 88 KIAS (best-rate) until reaching pattern altitude. Turn downwind, complete the before landing checklist, and prepare for a short-field landing.

SHORT-FIELD LANDING

We will eventually end up with full flaps on final approach. Exactly what procedure you use to get there will be up to you, after you get your private pilot's license. An instructor's objective is to try to instill some type of organized method to your flying skill. This, in-turn, will promote safety and insure you don't forget things (like landing with the gear up). If I'm going to use flaps for landing, and I almost always do, I will apply 10 degrees on the downwind leg just before turning base, 20 degrees on base, and save the rest for final if the need for more exists. There has always been a difference of opinion whether to even use full flaps for a normal landing, in some types of airplanes. For example, doubling the flap extension of a Cessna 182 Skylane RG from 20 to 40 degrees reduces the stall speed at maximum-allowable gross weight and maximum-allowable forward CG (the worst combination) from 40 to 37 KIAS. Some pilots refuse to ever use full flaps in case they need to abort the landing and go-around. This is just another subject we could beat to death. The point is, that you need to eventually end up with full flaps for this maneuver. I recommend extending to full flaps somewhere on short final in time to stabilize the approach, hands-off. Don't really take your hands off the controls, just set up the trim/power so that if you did remove your hand from the yoke (stick), the airplane would not pitch up or down. If I haven't mentioned it before, it is basically essential that you keep one hand on the yoke control and the other on the throttle during any takeoff or landing. After moving your hand from the throttle to raise/lower the landing gear, adjust the trim, or for any other reason, always place it back on the throttle.

The checklist for a short-field landing reads: airspeed-**70-80 KIAS** (flaps up), wing flaps-**40 degrees** (below 95 KIAS), airspeed-**maintain 63 KIAS**, trim-**adjust**, power-**reduce to idle as obstacle is cleared**, touchdown-**main wheels first**, brakes-

Figure FS.4 - In northern California, Palo Alto Airport is a good place to practice short-field landings.

apply heavily, wing flaps-**retract for maximum brake effectiveness**. After clearing the 50 ft. obstacle and reducing the power to idle, the airspeed will decrease quickly. To prevent a possible stall just above the runway, lower the pitch attitude just enough to maintain a safe airspeed and touchdown just above stall speed. Apply brakes, as necessary, to stop in the shortest distance consistent with safety. Raise the flaps to the full-up position during roll-out and try your best not to squeal the tires.

This particular maneuver requires extreme concentration on airspeed and altitude (rate-of-descent) control. A properly executed short-field landing leaves very little room for error. On final approach, adjust the throttle and trim to obtain a hands-off descent. Try to make the approach as effortless as possible and the landing itself will be less stressful. If you understand that the throttle controls the rate-of-descent and the pitch attitude controls the airspeed, you will be able to maintain a stabilized approach to landing regardless of the type of landing your conducting. For a real simulated challenge, try landing a 737 at Palo Alto airport in California. The runway length is just 2,500 ft! (Fig. FS.4)

THE CONSEQUENCES

The November issue of FLYING magazine had an accident report that illustrates the consequences of not following the published procedure for conducting a short-field takeoff. It was during daylight hours and clear weather in Pottsboro, Texas that a 1,505 hour private-pilot (with an instrument rating) failed to follow procedure. Following a social event attended by the pilot's friends, the pilot attempted to depart from a 1,500-ft. airstrip. It seems for some unexplained reason, there was only 1,100-ft. of runway available for takeoff and landing. The pilot used 10 degrees of flaps instead of the manufacturer's recommended 25 degrees. According to the airplane operator's manual, 1,700 feet was required to clear a 50-foot obstacle at sea level. Density altitude was 2,000 feet. The pilot intentionally ground-looped the airplane 1,397 feet from his point of brake release to avoid trees at the departure end of the airstrip. He still managed to shear off the airplane's right wing after impacting a tree. The passengers stated that the pilot was "showing off" his pilot skills for his friends by landing on such a small strip. The pilot sustained minor injuries and the two passengers sustained serious ones. The probable cause was the pilot's failure to determine, prior to landing at the airport, that the runway length would be inadequate for a safe takeoff, and his subsequent failure to follow the manufacturer's recommended short-field takeoff procedures. Factors in the accident were high density altitude and the pilot's ostentatious display. So... practice, study, and follow proper procedures. Be safe. Be prepared.

About the author - Bob Pursur has been flying in the Dallas, Texas area since 1973.He has been a CFI since 1977 and has been flying computer simulators since 1980. He is a Systems Tech. with Southwestern Bell Telephone and flys out of the Lancaster and Addison airports. He can be reached via Internet email at [fltsim@swbell.net]. [MW✈]

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Review Of... ...Approach Builder

One of the many impressive software demonstrations at the MicroWINGS Convention this past year was that of SimuTech's *Approach Builder*. Tim Freriks was at it again with a program designed to increase the reality of instrument approaches flown with *Flight Simulator* and an airplane he calls SimAir 2-8-Tango.

Approach Builder creates ATC adventures to fly an instrument approach procedure. As with SimuTech's *IFR Approach Adventures*, *Approach Builder* results in realistic-sounding ATC controlled instrument approaches with realistic background chatter. The difference is that, with *Approach Builder*, the user can select any instrument approach procedure to any IFR airport in the Continental United States or Europe and then design the course and altitudes along which ATC will vector the arriving aircraft to begin the approach. The *Approach Builder* program includes a database complete with every VOR, NDB, and paved, public airport in the Continental United States.

The program ships on a set of seven 3½" disks. Installation is performed in Windows and ran smoothly for me. *Approach Builder* is a DOS program, and no icons or program groups were established by the installation routine. *Approach Builder* is started by running "Approach.exe" from DOS. The program begins with a screen shot of a *Flight Shop*-generated aircraft on or nearing the final approach to an airport; several such screen shots are provided for variations in the startup screen.

The first screen on which a selection is made allows a new approach to be generated by selecting an airport three-letter identifier or city name, the revision of an existing approach, or flying an existing approach. If a new approach is being created, a second screen provides for the selection of the runway, and a third screen for the type of instrument approach to be created.

After these selections are made, a radar-like plan view appears and provides the means for designing the course and altitudes to be flown. On this screen, the course lines are drawn by the computer between mouse-click locations. Altitudes on a given segment are selected in 500 foot or 100 foot increments. The map view depicts the airport, the aircraft starting point, a localizer "feather" (in the case of an ILS or localizer approach), the nearest VOR and NDB, the extended runway centerline, and the initial path, which is always shown as a red line direct from the aircraft starting position to the nearest VOR or NDB.

Through a series of mouse clicks and button presses, the vectoring to and intercept of the final approach course is designed. Radar vectored and full (i.e., where vectoring is not available and a procedure turn is made) approaches can be programmed. *Approach Builder* creates an adventure file that includes randomly selected cloud conditions and time-of-day. Aircraft are selected from a menu that includes two user-selectable choices, the Cessna 182RG, the Lear 35, a DeHavilland Dash 8 (in SimAir livery), and a Cessna

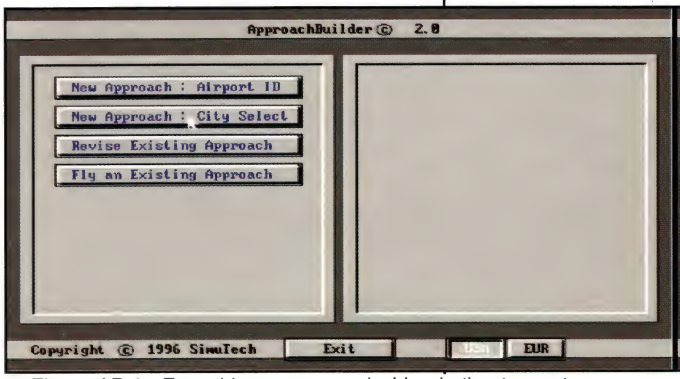

Figure AB.1 - From this screen, you decide whether to create a new approach, revise an existing approach, or fly an existing approach.

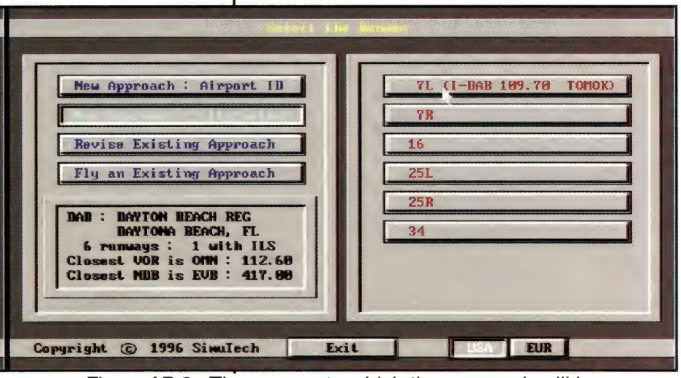

Figure AB.2 - The runway to which the approach will be made is selected from this screen.

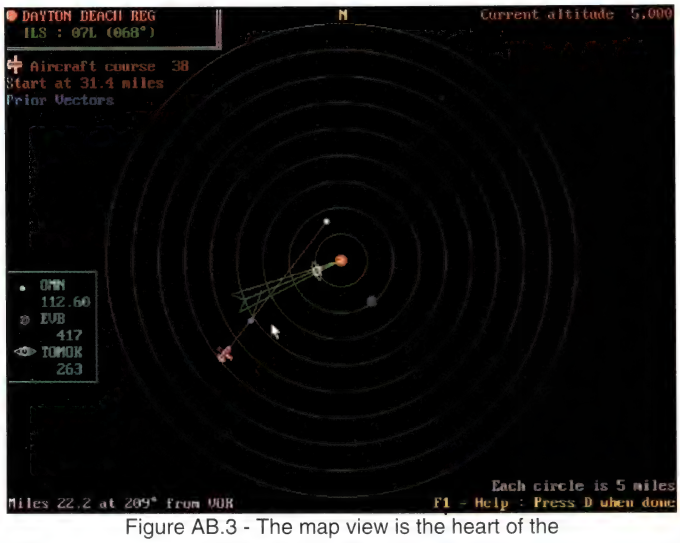

Figure AB.3 - The map view is the heart of the Approach Builder program.

414A (from *Rescue Air 911*).

If "Fly An Existing Approach" is selected within *Approach Builder*, the program offers the option of loading the requisite scenery. If the scenery (and navaids) are not resident on your *Flight Simulator* database, selecting "Y" will cause *Approach Builder* to load the scenery and remove it upon exiting *Flight Simulator*.

Approaches are selected in the Options/Adventure menu of *Flight Simulator*. A text bar offers screen printing of clearances and a co-pilot who will tune all of the avionics. Acceptance of these features (by pressing "Y") makes flying the approach easier. As skills improve, you should decline screen-printed clearances and co-pilot assistance to increase the difficulty of flying the approach.

The approach begins with the aircraft in a turn to fly direct to the nearest VOR or NDB. The autopilot is set to turn to the requisite heading and hold the initial altitude. You are on your own for all subsequent heading and altitude changes. When a frequency change to the tower is instructed, a transmission is assumed as soon as the correct frequency is tuned. It is unnecessary to press Ctrl and another key, as is necessary with *Flight Shop*.

One of the highlights of *Approach Builder* is the quality of the background chatter. I use the word "quality" in the sense of replication of a real-world environment, not high quality; many of the pilot transmissions are filled with static. The .wav files are matched pairs of pilot and ATC chatter. Some of the time, the controller calls an aircraft and the pilot responds; other times, the pilot calls ATC and the controller responds. The chatter is also tower or approach appropriate. In other words, the chatter that you will hear while tuned to approach control will not be such things as "Cleared to land runway 18, winds 1-6-0 at 1-0"). The chatter, however, is not airport or area specific. For example, while flying the ILS Rwy 36 approach to Washington National Airport, I heard the controller refer to runway 18L, a runway not present at National Airport.

A shortcoming in the program is similar to that of *IFR Approach Adventures*. Deviations in heading, altitude, and speed are corrected by a text bar rather than a controller. For example, instead of a controller's voice saying, "SimAir 2-8-Tango, groundspeed readout shows 300 knots, say indicated," the text bar prints, "You are exceeding the 250 knot rule." It would be nice (and more realistic) if the same controller's voice providing radar vectors to the final approach course would also ask about these deviations.

The version of *Approach Builder* that I tested was for Microsoft *Flight Simulator* versions 5.0a or 5.1. The *Flight Shop* adventure converter (for use with *Flight Simulator for Windows 95*) available from Microsoft did not successfully convert adventures created by *Approach Builder*. SimuTech reported that a converter that would allow adventures to be created for *Flight Simulator for Windows 95* had been developed, but I did not have an opportunity to test it. System requirements for the DOS version are *Flight Simulator* version 5.0a or 5.1, *Flight Simulator Flight Shop*, Windows, and a Sound Blaster compatible sound card. To fly the approaches, instrument approach procedure charts are necessary.

Approach Builder is available from Apollo Software Publishing or from MicroWINGS commercial member Flight Sim Central.

About the author - Jonathan Stern is counsel with Dombroff & Gilmore, P.C. in Washington, D.C.. He holds comm pilot, CFI, ground instructor, and control tower operator certificates. He is also the author of two books on Flight Sim: Microsoft Flight Simulator Handbook and Flying On Instruments With Flight Simulator. Jonathan can be reached via email addressed to 73502.2437@compuserve.com. [MW✈]

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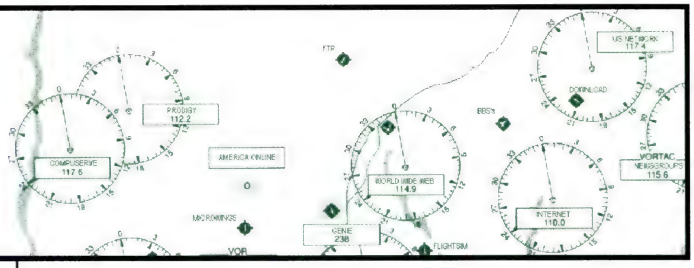
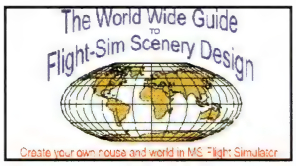
Flight Simulation On-line



The Internet is touted as a great resource for research and information. But all too often a great sounding site ends up having little to offer, other than perhaps links to even more great sounding sites.

It's no different when searching for flight simulator and aviation information, but "the good stuff" is out there if you look hard enough. This month I went looking for online resources for flight sim scenery development and turned up some good quality resources.

THE WORLD WIDE GUIDE TO FLIGHT-SIM SCENERY DESIGN



www.vianet.net.au/~kraybill/fltsim5/

This site, located in Australia and run by Gene Kraybill, is a must for anyone starting out in flight sim scenery design. For that matter, even the most experienced designer will no doubt learn something from a visit here. This site has it all—the tools (or at least links to them) needed for design, tips on all aspects of design, and information on the raw data needed to make scenery. Let's take a look at the areas this site offers.

World Wide Scenery Awards — Naturally, scenery designers are interested in making better scenery and in finding what scenery is "best". The site sponsored a contest in 1996 to choose the best scenery and it turned out to be the Balearic Islands scenery by Juan Cabeza. An interesting choice, since this scenery has been out since 1994 and in fact was one of the very first major scenery designs for FS5. It just shows how ground breaking the Balearics was.

Dictionary Of Scenery Design Terms — The beginning designer will no doubt have trouble just understanding the terminology. There are a lot of abbreviations and acronyms to learn, but this section covers them all.

Getting Started in Scenery Creation — Here is where a new scenery designer should start. Scenery design for FS5 and FS6 involves a number of steps, and it's necessary to understand these steps before getting started. Not only are there many steps, but at many of the design steps there are choices of tools and techniques that must be made.

This section covers all these steps, starting with choosing a scenery compiler. It also covers gathering information (like maps), understanding scenery file structures, using scenery tiles, adding procedural scenery (like roads), creating menu listings, adding ATIS, beacons and dynamic scenery, and finally compiling and testing. Each step is covered in a lot of detail. Anyone going through this entire section will have a very good idea of what's involved in designing scenery.

Choosing A Compiler — Though mentioned in the previous section, this choice is so important, it also gets its own separate area. There are now a number of freeware compilers available, plus several commercial products (and at least one more on the way). The freeware compilers each have strengths and weaknesses and also have add-ons (like graphical front ends) so understanding them is important.

Special Aids and Utilities — A scenery compiler alone is not sufficient. Other tools are necessary and this sections covers the wide variety available. Reading this section you'll learn about texture editors and other graphics makers, decompilers, chart makers, and so on.

Knowledge Bank — Since FS5 scenery design started with no official information about scenery file formats, sharing of information between designers has always been vital. With several years now passed since the first design attempts there is a lot of knowledge available. This section gathers up much of this knowledge, beyond the basics covered in the other sections. It includes short tips and some lengthier explanations. This is a great resource once you've absorbed the basics from the other areas on this Web site.

The World Wide Guide to Flight-Sim Scenery Design certainly lives up to its name. If you want to design scenery for FS5 or FSFW95 this Web site is the place you should start.

One of the things learned from the World Wide Guide is the need for sources of information about airports and about the overall geography of new scenery areas. With a little digging, it turns out that plenty of this information is available on the Web too.

AIRNAV

www.airnav.com

AirNav is run by Paulo Santos who calls it "the pilot's window into the world of aviation information". This description is accurate and though the site is meant for real world pilots, its contents prove quite useful for anyone needing airport and navigation information, whether for scenery design or just for flying your flight sim around.

AirNav provides free access to official FAA data. It's all searchable and information is easy to find. There are three areas that are likely to be of most interest to flight sim users.

Airport Information — This section lets you search for an airport, based on name, airport ID (like "JFK" or "LAX"), etc. What the search turns up is a lot of information about the airport, including location, runway descriptions, radio navigation aids and communication frequencies, significant obstructions, and a wealth of other information for pilots. If you're familiar with FAA publications, this is a lot like an online version of the Airport/Facility Directory, but it has even more detail and is much easier to read.

It also goes beyond the FAA books by including private and military airfields. Also included is information about businesses at the airports. If available, links are offered to Web pages run by the individual airports, businesses, etc. For scenery designers this will supply all the needed information about runway dimensions, lighting systems, related navaids, etc.

NavAid Information — This section is a database offering searches similar to the airport database. Information on each NavAid includes detailed technical and operational information. A scenery designer can use this for exact NavAid placement and coverage area selection.

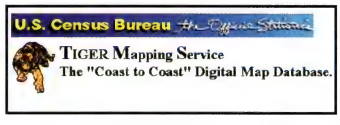
Fix Information — Instrument pilots are probably most familiar with fixes, those positions in space designed by often humorous five letter names. This section is another searchable database that will give you everything you need to know about any available fix.

AirNav also has sections on fuel availability and FBO info. These probably aren't of direct interest to sim pilots unless you care to refuel only at those airports that have real world fueling facilities. Scenery designers can use this information to decide which airports get refueling areas. The fuel planner can also be useful as a simple flight planner. Give it start and end points and it will find routes with fuel stops along the way. Pick a single route from the choices and you'll be shown a flight chart with headings and distances between refueling stops and even a simple map of the route.

The one thing that AirNav doesn't provide is visual information, i.e. maps and charts. Our next stop will help in that area.

TIGER MAPPING SERVICE

tiger.census.gov



Tiger Mapping Service (TMS) is a complete U.S. digital map database. The data goes right down to street level details and includes accurate coastlines, roads, railways and so on—just the kind of information needed by scenery designers when laying out the big picture of an area.

A number of ways are given to get at this map data. There are forms you can fill in to display a map which you can them adjust by zooming in and out, scrolling from side to side and so on. It's really quite easy for a beginner to get started right away by doing this.

More advanced users can build a custom URL that will create a map exactly to your specifications. In the URL you can

include arguments for the map's latitude and longitude and the size (in degrees) of coverage. You can make the map any size (in pixels) that you want. You can fine tune it by turning various details (roads, railroads, state borders, etc.) on and off. You can also indicate locations within the map with a variety of markings. The system is extremely powerful and really not that hard to use once you've read the information page.

The only drawback is that it can take a while for the map to appear. But considering that the map is actually being drawn to your specifications before being sent, a little wait is not unreasonable.

TMS is a nice system. Even if you're not creating maps for scenery design or navigation you'll probably enjoy experimenting with the system. Also, the maps are public domain so you can do anything you wish with them.

CONCLUSION

These are just some of the online resources available to those doing flight sim scenery design. An Internet search will turn up others as well, for example the NASAO/Center for Aviation Research & Education offers airport and NavAid information very similar to that available at the AirNav site (www.nasao.org/5010/5010_search.html). There are other sites offering mapping as well. The Internet really does prove to be a useful tool for flight sim scenery designers and will likely only grow in usefulness.

About the author - Nels Anderson has over ten years experience in PC based communications. He runs his own system, Xevious BBS in Framingham, Mass. and maintains a Web site devoted to aviation and simulators. Nels also holds a Private Pilot's license. He can be reached via email at 71020.2613@compuserve.com. [MW✈]

CROSS WINDS

with Charles Gulick

Signs of the Thames

The world of Ultralight flying in Flight Simulator recently got more exciting. First, Rush Mueller released a Windows 95 version of his Ultralight, the Model Z, featuring his own choices of both wing colors and flight model. The original Flight Simulator Flight Shop Ultralight was not entirely what designer Rush originally intended. The improved Model Z is available in CompuServe's FSFORUM. It is also scheduled to be in the forthcoming (as of this writing) upgraded version of Flight Simulator Flight Shop. The new Model Z has livelier colors and good FS95 flying characteristics. The plane is 17 feet long, with a wingspan of 28 feet. Powered by a 2-cycle 30 horsepower engine, it weighs only 230 pounds.

Second, FS panel designer Jorge Alsina created a panel especially for the Z—a knockout (see the screen shots in this Crosswinds). This snazzy panel, with its crisp colors and clean outlines, gives you the raw information you need to fly, namely (reading counter clockwise from the top) compass, altimeter, airspeed, and throttle setting (RPM). *And while flying you can prop your feet on the cross-members*. This panel is also available on CIS's FSFORUM, as well as on the MicroWINGS web page (panel download section) and on the CIS Simgames forum.

The last time I wrote about the Ultralight, in MicroWINGS Volume 3, No. 6, I included the APL code for my little "TrimChek" program. Because that program doesn't work in FS6/95, and I want to describe the trim setting for the new Ultralight, I include here the code for a new version. It is not as good as the original, due to bugs in FSCONV.EXE, but it will do the job. FSCONV.EXE is needed to convert the code below into the FS6/95 Adventure form. Type the following lines exactly, using a text editor:

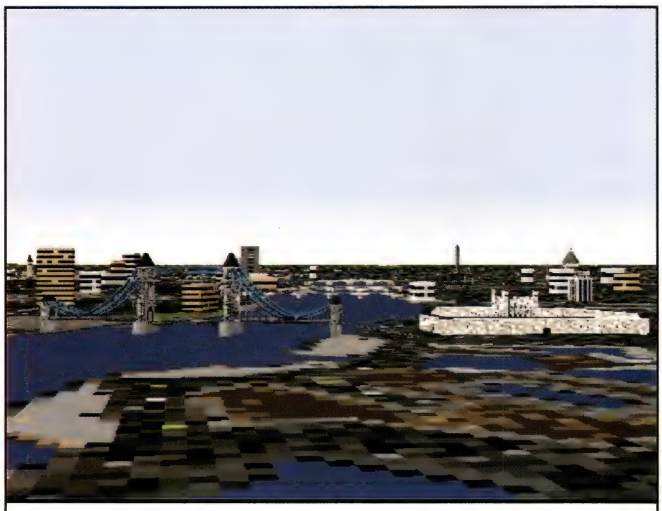


Figure CW.1 - Tower Bridge and Tower of London on the Thames.

```
TITLE"Trim"
DESCRIPTION"Trim to desired value. Press Ctrl+q to quit."
ADV_KEYS ADD, KV(CTRL"q")
start:
WAIT 1, KEYPRESS
IF KEY=KV(CRTL"q")THEN
GOTO quit
ENDIF
p=INT(ELEVATOR_TRIM_POSITION)
PRINT_TIME 1
PRINT p
WAIT 2
RESET_ADVENTURE
quit:
END
```

If you don't have the Alsina panel, and/or don't have the means of creating/converting the code, don't worry about it.

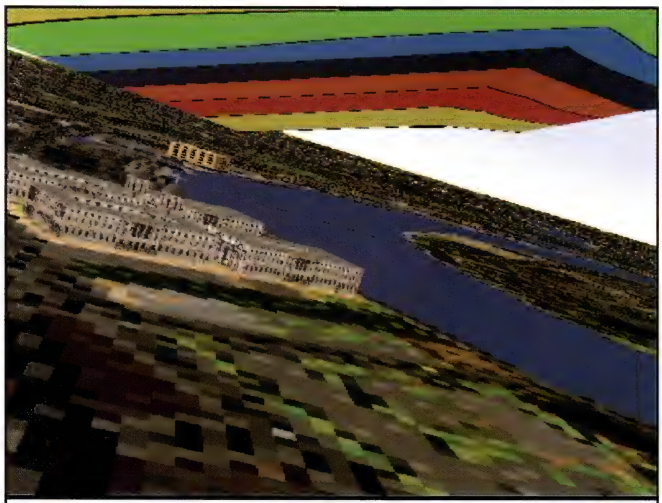


Figure CW.2 - Magnificent but mysterious building near Gravesend

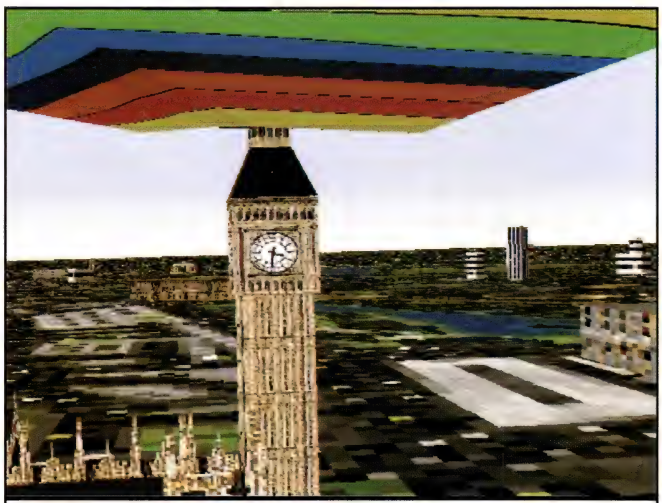


Figure CW.3 - Clock close-up out the right side of the Ultralight.

You can use whatever trim you normally use for flying the Ultralight. And you can fly with any panel—or better yet, NO panel (if you've never tried the latter you'll find it's quite easy, as well as visually very rewarding). In fact, you can use the original Ultralight, too. I want to make all this as easy as possible for you, so you'll get the kicks you deserve out of flying Rush's neat little plane, and seeing the sights we're going to see.

When you're sitting in the Model Z (what airport doesn't matter for now) first assure yourself that you won't run out of gas (that happens pretty fast in this airplane). To do that, enable Aircraft... Realism & Reliability... and disable Engine Stops When Out of Fuel (if it's enabled). Next, enable Crash & Damage and—just for our purposes on this flight—enable Ignore Crash.

Now enable World... Set Exact Location... and put the aircraft exactly at N 051 30 20.3709, E 000 03 51.2874, Altitude 19 and Heading 276. Double-check these parameters, and when you're sure you have them right... click on OK.

Surprise!

You're on a convenient little slice of the river Thames which serves as a landing strip for seaplanes and amphibians. And as of now, you are flying a pontoon-equipped Ultralight—ideal for a trip along the Thames to London Town.

If you have my trim program, described above, boot it via the Flights/Adventures menu and set trim to about -383 (exact setting is not critical, just get as close as you can). Press Q to quit the adventure once you are trimmed.

Another surprise: your sea base parallels London City Airport, and if you check your map you'll see London City's Runway 28 at nine o'clock. You are approximately six miles east of London proper, in an area known as the Royal Docklands—there are docks all over hereabouts. London City Airport is served primarily by STOL and commuter airlines; its short runway won't handle the heavies, which use Heathrow and Gatwick. This airport has one of the most unique environments in England, very watery as you'll see when you get airborne. Let's do that now. However, you may want to save your flight at this startup point, giving it the title of your choice; I used "Royal Docklands Sea Base".

The Ultralight should lift off nicely at about 40 mph (note the gauge reads miles per hour, not knots). Keep your climbout shallow so as to enjoy your surroundings. Cruise at about 200 feet, steering around any buildings of course, and generally following the Thames. You'll likely get a long pause at one point, but wait it out.

Soon you'll see a splashy white structure, to the right of a bridge that looks as though it's painted a pastel blue. Point to fly between the two. The splash turns out to be a wall, surrounding the infamous Tower of London, and the bridge is the Tower Bridge—one of more than two dozen that span the

The bistas of London, England as seen through the eyes of a an Ultralight Pilot

Figure CW.4 - Westminster Abbey (note four-faced clock).

Figure CW.5 - Ultralight shoots impromptu palace-grounds landing.

Figure CW.6 - FS' virtually real Buckingham Palace guards.

Thames in and around London. Anciently, the Tower was a fortress, and then later was a royal residence and a jail for high profile prisoners, many of whom were beheaded there or on Tower Hill just north of the walls. The structure today is an arsenal and museum (Figure CW.1).

Now if you're a bridge lover, you're approaching heaven. Here are, in order, London Bridge, Southwark Bridge, Blackfriar's Bridge, and Waterloo Bridge. The first reminds me of Muhammed Ali's wry comment about his approaching fight with George London: "London's bridge is falling down." And it did. The name Waterloo Bridge reminds me of the old black and white movie of the same name, and its lovely leading lady Vivien Leigh, who also starred in "Gone With The Wind".

As you round the bend of the river you won't be able to miss the resplendent Westminster Abbey (Figure CW.4), beautifully rendered in the simulation. And the bridge at that point is, of course, Westminster Bridge. Take a look to your right and see if you can catch a glimpse of the four-faced Westminster clock (Figure CW.3).

As you cross the next bridge, the Lambeth, turn right (using a shallow bank and dodging the buildings as needed) until you see an ornate brownish structure—Buckingham Palace (Figure CW.5)—this side of a little finger of water. Immediately chop your power and plan to land on that brown patch of ground just beyond the Palace (I didn't tell you, did I, but your pontoons are equipped with wheels, so you're amphibious.) Wherever and however you land, get turned around so you can see the front of the palace, where you'll remark the palace guards out in full force. Taxi up close and see if you can get any of them to blink an eye (Figure CW.6).

We should get out of here in a hurry (Scotland Yard is only a stone's throw from this spot). So I've arranged an escape party managed by a swarthy character named Slew. However, we're not going far from Buckingham Palace.

Western Style

Go into World... Set Exact Location... and put your amphibian Ultralight at N 051 30 05.4680, W 000 10 12.1755. Make the altitude 18 feet, and the heading 299. Note that our earlier position had an East longitude, and here—just a few miles removed from London City Airport—we encounter a West longitude. England is one place where the twain meet.

When you click on OK you'll find yourself ready for takeoff on a small body of water just slightly more than two miles west of Buckingham Palace. Turn on your map, and adjust zoom until you see the whole snake-like shape of the water you're sitting on (it's aptly called The Serpentine). You're in a large parkish environment. To your left is Kensington Gardens and to your right Hyde Park. The portion of The Serpentine curving northward is called The Long Water.

What you're going to do now is take off, and as soon as you're safely airborne, make a left turn until you are heading about 45° and are pointed toward the very tallest structure hereabouts—the long thin building with what looks like a spire or an antenna on top of it. As soon as the greenery of Hyde Park disappears under you, you are over Mayfair, a very elegant section of London, bounded by Picadilly to your right and Oxford Street to your left. Mayfair is characterized by world-renowned hotels and shops. After another couple of miles you're over Soho. Stay well to the right of the tall building and, if you have very sharp eyes and a fertile imagination, you may be able to spot the Old Curiosity Shop below, just north of Fleet Street. Don't I sound cosmopolitan, though? But the truth is, I've never been to London, or to most of the other places I mention in these columns. I just keep a healthy supply of maps and specialized atlases on hand, and imagine myself in all those storied environments. To me, that's what flight simming—and all simming—is all about: imagination.

As the tall building disappears off to your left, turn right and head for the Thames again, dodging other buildings as necessary. Just keep banking right until you see the river, and then pick it up eastward. Now you'll truly be flying with the river, because that's the way it flows—eastward. You'll have a fine view of St. Paul's Cathedral as you fly. It's that cathedral-like structure, off (probably) to your left. Take several views of it as you pass. Truly spectacular.

On this pass, fly directly through the center portion of the Tower Bridge. Disable the instrument panel (W key) for a wide-open view. Note the elaborate detailing of all parts of the bridge.

Follow the river as it bends to the left, and then again to the right, and again left, forming multiple S-shapes through the city. As you round one bend you'll see what looks like a big red silo ahead, and at the water's edge, a huge building complex. Fly some circles around the latter while I try to figure out what it is (Figure CW.2).

It seems we should be somewhere near Gravesend, but otherwise I've come up with blanks. If anyone reading this knows where and what this big complex is, please drop a line to me at MicroWINGS or CompuServe's FSFORUM (ID 71241,321) or the Internet (softpubs@aol.com) and clear up the mystery. Thanks!

Continue S-ing along the Thames, and shortly you'll spot Runway 10/28 at London City. Winds being light and variable, we're approved to set our amphibian down on Runway 10. So be it. So do it.

So, now do you feel sort of cosmopolitan?

About the author - Charles Gulick is the author of six books on the various versions of Flight Simulator, the "Fly" series of situation disks, and the recent "Global Wizard" adventure set for use with FS5.1 / FS95. Charlie can be reached via email to 71241.321@compuserve.com. [MW✈]

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Review Of... ...Microsoft's Southern California Expansion Pack

Palm trees, white sandy beaches, and surfers are among the images that come to mind when we think of southern California. Hollywood, the ultimate land of make-believe, also figures prominently in our collective vision of that region. Add Disneyland to this mix and you end up describing the haven of all true dreamers. What better place might there be to transport into the world of Virtual Reality? And, of course, what better realm could there be to add to the world's favorite flight simulation?

The official title of this fantasy is "Expansion Pack for Microsoft Flight Simulator for Windows 95 " with the subtitle "Southern California Scenery—Adventures and Challenges." It is the first Microsoft add-on to Flight Simulator for Windows 95 (hereafter called FS95). Because of the default naming of some of the subfolders, the new add-on is often referred to on websites and on-line services as SOCAL. It is distributed on CD-ROM only and retails for about $30. In general, I find it to be a very worthwhile addition to FS95. Along with thousands of square miles of new scenery, it contributes eighty new airports, nine new adventures, four new challenges and a host of new navigational aids. For a genuine FS95 addict it is a "must-have."

Fig SC.1 - Catalina Island... "twenty-six miles across the sea".

Fig SC.2 - Approaching magical Palm Springs, Ca.

The rig I used to evaluate SOCAL is a Pentium 166 with 256 KB of Pipelined Burst SRAM L2 cache and 32 MB of non-EDO RAM. It also has a 4 MB Stealth 3D PCI video card, a SoundBlaster 16 audio card, and a Mitsubishi 6X CD-ROM drive. Because SOCAL does not have a terribly negative effect on frame rate, it will probably run acceptably on slower machines. For best results, however, the user should have plenty of free hard drive space (over 160 MB).

Installation is pretty simple and straight-forward. One can choose a "Typical" installation which leaves the scenery files on the CD, or a "Complete" installation which copies all files to a hard drive. Although the "Complete" installation requires over 160 MB, I heartily endorse it for reasons I will explain in a moment. Hard drives are getting bigger and cheaper all the time and, if you're a real FS95 freak, you might find a way to free-up all that space. One piece of good news is that SOCAL has an "uninstall" option that removes everything if you should ever get tired of it.

Let me say a bit more about installation. If you choose to put SOCAL on a drive other than the one your FS95 files are on (as I did), it has no problem doing so and it sets up the scenery library to find the scenery files. Be advised, however, that you will need to copy challenge files, adventure files and adventure WAV files into your old FS95 subfolders for them to show up in the menus. As I was finding all this out, I also discovered that SOCAL works very nicely with FS5.1. If you're like me and still have FS5.1 on your machine, simply tell its scenery library where to find the SOCAL files. Just remember to put a copy of SCALFAC.BGL in the \FLTSIM5\SCENERY subfolder so that the 80 new airports will show up in the FS5.1 airport menu.

As a matter of fact, as long as you have Windows 95, you don't seem to need FS95 in order to run SOCAL with FS5.1. You just need to know how to install new scenery directories by hand. None of the files on the CD seem to be compressed or otherwise encrypted, so copying them to FS5.1 is no problem. I don't know if Microsoft sanctions this sort of thing, but it works.

When I first installed SOCAL, I chose the "Typical" installation to save hard drive space. The result was very eye-opening. Veteran users of Microsoft Flight Simulator have long noticed slight pauses as a plane flies around and the program needs to load new scenery files. With SOCAL, the pauses were so long that I originally kept re-booting the computer, thinking that the program had frozen-up! Maybe some of it was my 6X CD-ROM drive, but the pauses were so incredibly long that I doubt if anyone would find them acceptable even with a 12X. Perhaps some of it was that it was filling-up my memory, 32 MB at a time. However, if you have less RAM, the pauses might be shorter but they will certainly be more frequent.

The solution, of course, was to run the "Complete" installation and put everything on the hard drive. On my particular machine, the pauses almost totally disappeared. This is why I most strongly recommend that you find the hard drive space and choose the full installation. If you can't afford the space, you might think about saving your money for a new hard drive before purchasing SOCAL. When running scenery from the CD, the pauses are that breathtakingly long.

Having warned those with small or full hard drives, I must admit that other aspects of SOCAL are much more satisfying. Since the great majority of the hard drive space (over 136 MB) is taken-up with texture files, it is appropriate that the scenery textures are among the most appealing features of the package. In particular, the rural scenery textures are excellently done. Figure SC.1 shows Catalina Island, off the coast of Los Angeles ("twenty-six miles across the sea" for those who remember the old song). To my mind, it is a great example of the splendid rural textures of SOCAL, and I think it looks even better at night. Figure SC.2 is a shot of the Palm Springs area, East of Los Angeles at the edge of the Mojave Desert.

The first time I ran SOCAL, I started out at Los Angeles International Airport (LAX). As a result, my first view of scenery textures was of the Los Angeles area and I must admit I was not impressed. The dominant color seemed to be a sickly yellow that didn't remind me of the Los Angeles I had seen with my own eyes. Maybe someone was trying to simulate smog, but I would think the haze feature would be the way to do that. Aside from the color, the texture just seemed to be far too "busy," not looking realistic at any distance. Later, as I flew around the San Diego area, I found that many of the other urban textures of SOCAL were **much** more to my liking.

Because this issue is largely a matter of personal taste, I offer Figure SC.3 so the reader can get an idea of what I'm describing. This is a picture of the coast of Los Angeles taken on a clear day at about 20,000 feet. I must admit that the colors have grown on me and don't seem so bad any more. However, the textures still seem "busy" and

Fig SC.3 - At FL200, approaching the Los Angeles area.

Fig SC.4 - At FL200, Approaching the San Diego area.

Figure SC.5 - No description needed here!

Fig SC.6 - Sleeping Beauty's castle and the Matterhorn at Disney Land!

don't look very photo-realistic. On the bright side, by not using true photo-realistic textures, the scenery achieves a very decent frame rate. For comparison to Los Angeles, Figure SC.4 is a similar view of San Diego. Although still not photo-realistic, these San Diego urban textures appear to me to be more natural.

Along with the myriad textures, SOCAL includes many specialized scenery objects. These provide interesting additions to sight-seeing excursions. To give the reader a few examples, I chose some famous sights from the Los Angeles area. Figure SC.5 presents the trademark HOLLYWOOD sign as seen by a reckless Cessna pilot. Figure SC.6 shows the view of a pilot about to get into trouble for landing at Disneyland. Sleeping Beauty's castle and the Matterhorn are both clearly visible. Finally, figure SC.7 displays the Queen Mary tied-up at Long Beach. SOCAL includes many more such objects too numerous to mention. The Pilot's Handbook user's manual contains maps which assist in finding these gems. Speaking of the manual, although it is rather brief, it is nicely augmented by lots of on-line help.

The visual aspects of SOCAL are not its only satisfying features. As mentioned above, the package comes with new adventures and challenges. Although I have not yet completely flown them all, the ones I have completed are uniformly well done. Of particular note is that the sound files are of excellent quality. In FS5.1, many people complained about the quality of the sounds in the adventure files. These problems seem to have been nicely solved in FS95 adventures.

One of the things I really liked about the original Learjet adventure that came with FS95 was that the copilot took care of setting instruments and radios. This feature is continued with all the new adventures. I often find it difficult enough to fly the plane without also having to constantly change frequencies and OBI settings. Even when it's not a lot of work, it can interfere with sight-seeing. Of course, there may be those who enjoy the realism of doing everything themselves. For them I can only suggest that they look into third-party custom-tailored adventure utilities.

To summarize, I found SOCAL to be well worth the price. Although individuals can always quibble over details like texture colors, I believe most FS95 users will agree that this scenery is an improvement over the default scenery. Individuals might also argue that the sacrifice in hard drive space is too great. Upon reflection, I suppose I have concluded that it's worth the sacrifice. Regarding other aspects of the package, it could easily be argued that the new airports, navigation aids, challenges, and adventures would by themselves be worth the money. After having spent some time with it, I not only feel good about SOCAL but I'm also looking forward to future Microsoft add-ons. In the meantime, you can find me in those virtual skies, doing a lot of dreaming.

About the author - Chuck Dome is a highly skilled flight simulation user and contributor. He has created countless utilities for creating, modifying, and using aircraft, scenery, panels, and more. He is active in Compuserve's FSForum and can be reached via email addressed to 72723.734@compuserve.com. ***[MW✈]***

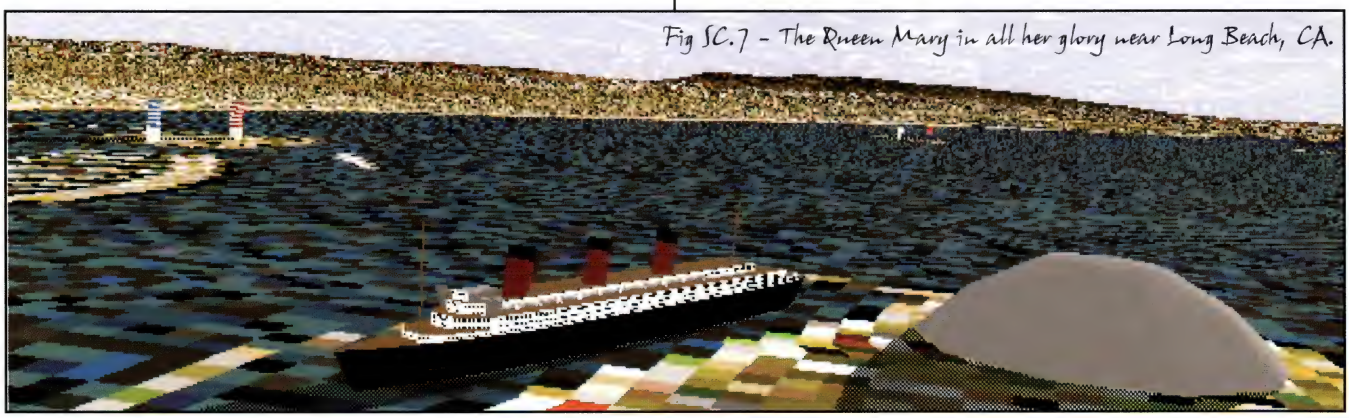
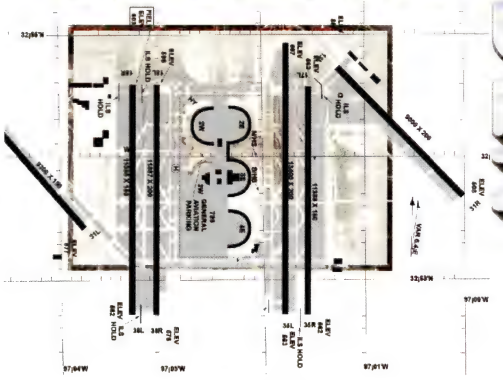


Fig SC.7 - The Queen Mary in all her glory near Long Beach, CA.

DESIGNER's DEN

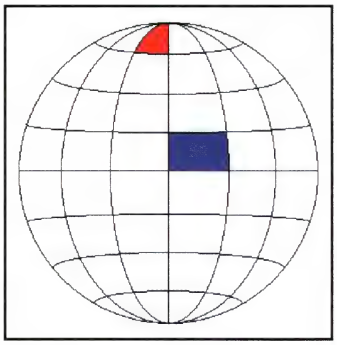


with Matthijs Becker

Note: This article is a continuation in a series of articles on how to create scenery. It builds upon the foundations and principles already discussed in earlier issues. If you do not have them, it is highly recommended that you perhaps order them as back issues from MicroWINGS (V4N2, V4N3-Sold out-See web site, V4N4, V4N5).

Synthetic Scenery

After having created airports in prior issues, it is time to make some scenery between the airports. The default FS5/6 ground was created very coarsely, so on places where there should be water you get land and vice versa (especially on the coasts). The program Airport lays around the airport a piece of ground, but that's just a small piece, in this issue we'll go through the designing of the ground for scenery. The way that is used here, called synthetic scenery, is not very precise, but can easily be used for designing large parts of scenery and has some very useful aspects.



The earth (in FS5/6) is divided into lots of tiles from which the parts are parallel to the longitudes and the latitudes. The latitudes are always equi-distant from each other, all over the world. So, the tops and bottoms of the tiles are always parallel and are the same distance apart. It is different with the left and right end of the tiles (the longitudes), because longitudes are not equi-distant apart, but come closer together towards the poles (so the distance between the left and right side become less if you go to the poles and more towards the equator). It might help to understand this better if you take a look at the globe figure. Notice how the red tile near the pole is much smaller then the blue tile near the equator.

Tiles come in 6 different levels of resolution. The first one divides the equator into 256 equal tiles and is very coarse. The sixth resolution is much more precise and can divide the equator into 8,192 equal tiles, but even at this level of resolution, the width of the tiles near the equator are still rather large at around 5 kilometers in size.

To use lat/lon coordinates to place these tiles would be rather complicated. Therefore, all the tiles in the different resolutions have more simpler row and column numbers with which you can lay down a tile of a certain type. To know what the row and column numbers should be, you can use the program POS, which is part of the program BGLGEN which will be discussed later. With the command POS <resolution> <N coordinate> <E coordinate>, the program will give you the row and column number to use. <resolution> should be between 1 and 6. <N coordinate> and <E coordinate> for the north coordinates and east coordinates. For the western and southern part of the world it will be easier to calculate the coordinates with the program Airport (discussed in prior issues).

BGLGEN

I've already mentioned the program BGLGEN, which is the easiest program to use for designing synthetic scenery. It was created by Enno Borgsteede and can be downloaded from many places. There are different versions of this program, but to make the scenery in this issue it doesn't matter much with which version you use. To make use of the program you have to make an ASCII (or Text) file that contains the commands for BGLGEN. You can use all kinds of text editors, but make sure the saved format is text and not another type such as a Microsoft Word or WordPerfect document. After you saved the file you can compile it into a BGL-file, which is understood by FS5/6. The syntax for compiling is: BGLGEN <the file with the commands> <the scenery name with the extension BGL>. Now you can copy the resulting BGL file to the FS5/6 scenery directory and fly through the scenery. To make the switch between the editor and flight simulator easier, you can make a batch file which will compile and copy the scenery-file and after that start FS5/6, when you execute it. The following example would be for running FS5.1, assuming the BGLGEN commands are in a file called microwin.txt...

```
BGLGEN MICROWIN.TXT MICROWIN.BGL
copy MICROWIN.BGL C:\FS51\SCENERY\MICROWIN.BGL
cd\fs51\
fs5
```

Save the above commands in a text file such as microwin.bat and place it in the directory where you have the program BGLGEN. To make it even easier you can make a start-up situation in FS5/6 that starts you at the scenery you are creating.

The BGLGEN text file that will be compiled must start with a header, to set the area in which the scenery is to be situated. To set an area in the Netherlands you would use:

scenery 4 60:00 45:00 10:0 0:0

The second and third parameter are to set the latitude, the fourth and fifth to set the longitude.

Creating a Tile in BGLGEN

After you have found out the row (for the latitude) and the column number (for the longitude) for a certain resolution you need two commands to lay down the first tile. First you start with the command synth <resolution> <row-number>. You then set the latitude for the tiles you can input hereafter with the command block <column-number> <3 selectors to input the kind of underground> <altitude>. You can repeat this block-command for the tiles you will lay in the row you fixed with the command synth. If you want to lay tiles in another row, you must use the synth command again and after that use the block commands again. Example: You want to lay 2x2 tiles before the Dutch coast at the co-ordinates N52 E4, with the finest resolution of 6 at an altitude of 10 meters. With POS you find out that the row and column numbers are 1381 and 91. The commands would then be:

Synth 6 1381
block 91 05 00 1111 10
block 92 05 00 1111 10
Synth 6 1382
block 91 05 00 1111 10
block 92 05 00 1111 10

The second, third, and fourth parameters are to select the kind of ground. The grounds are divided in three classes namely terrain, coastlines, and mountains. The second and third parameters are called selector one and two and the fourth parameter is for the object kind.

Creating Terrain

If you want to create areas with a certain type of ground such as an urban area, green area, or sea, you should use this function. For these types, the object kind must be set to 1111. The first selector is for the kind of terrain as shown in figure DD.1. The way you see the areas here aren't very beautiful, because the distance is too large, but you can get a good idea what the area looks like. To look at it from too short distance isn't beautiful either, because you only see certain blocks. Only from the right distance can you discern and see features such as roads and farmlands. Some will even appear to have different elevations although, in fact, the scenery is most of the time flat in these cases. The only deviation to this are the areas 88 and 89, which are hills, not to be confused with the mountains, later discussed, and the buildings that appear in some city-areas, but they aren't as realistic as the buildings that we have built in the issues before, because there are no windows, lights, etc.

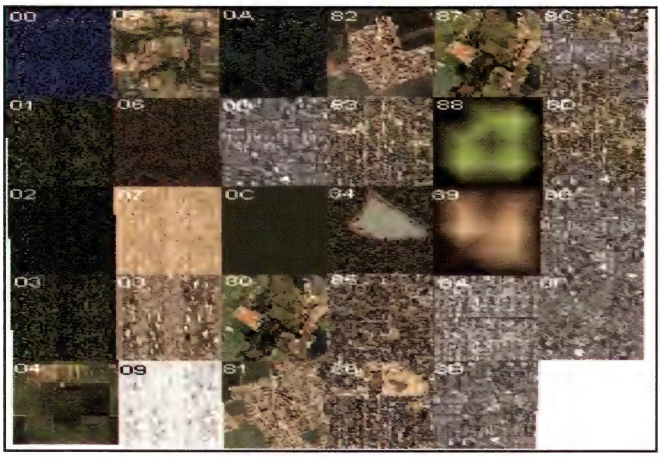
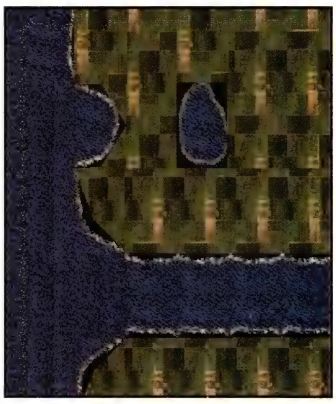


Figure DD.1 - Some of the textures you can use as a foundation.

The second selector isn't used if the object kind is set to 1111, so it doesn't matter what the number is, but there must be a number input, to avoid errors during compiling.

Creating Coastlines



With synthetic scenery there is a way to let the sea smoothly merge into the land with a coastline and simulated breaking waves. For this ground type, the object kind should be set to 3333 or in some cases to 4444. The first selector is used in the same manner as with terrain, and sets the kind of land behind the coastline. With the second selector you can set where the land is and where the water is, and where it eventually turns, or rivers. The possibilities are shown in the figure, and for the numbers for selector 2 you can look for the list in BGLGEN's help-file. If the object kind is set to 3333 the straight coastlines can be made with 01, if the sea is to the left (assumed that the north is at the top). There are special numbers for lakes, harbors (a bay in the coastline as shown in the figure, left of the lake) and rivers (the line of water at the bottom of the figure). For bends you can set the object kind to both 3333 and 4444. The difference is shown in this figure on the right. With the two bends, the sea is in both cases left and above, but the bend is different. The bend at the bottom is a bend with the object kind set to 3333. In that case a relative large part of the tile is taken by the sea, while with the bend at the top, with the object kind set to 4444, a relative large part is taken by the land.

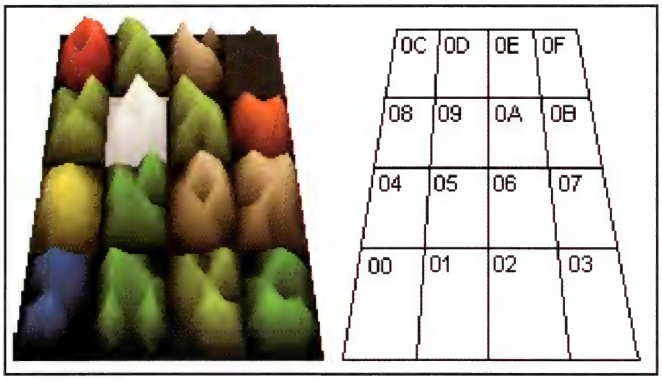


Figure DD.2 - Various mountain styles and shades.

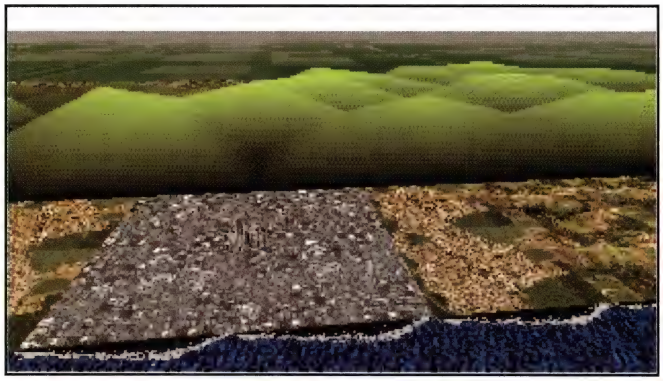


Figure DD.3 - A city and surrounding farm lands, bordered by the shoreline and the edge of a small mountain range.

Creating Mountains

The third kind of terrain are the mountains. For this object set the object kind to 2222, and now you can set the kind of mountains with selector 2. In figure DD.2 you can see what kind of mountains are available, the numbers in the figure are for selector 1. Notice that this picture is taken in FS5.1 and in FS5.0 the mountains look different. Take a look at the help-file for a list of the possibilities. It is possible to change the altitude of the mountains, by changing the number of the first selector. The first selector consists of two digits, the second one is for the kind of mountains. In the figure the first digit is a zero, and than the moderate altitude of the mountain is given. If you set the first digit to one, a very low mountain will appear, while if you set a higher digit the mountain will be higher, but be careful, because I noticed that a digit around eight could make the altitude of the mountain already above 10000 feet. Another point that influences the altitude of the mountain is the number of tiles that lay together to form one mountain, and this influences the shape of the mountain as well.

The picture in figure DD.2 is taken in summer, but in other seasons the color of the mountains 0D and 0E changes to white, to make the use of mountains with snow possible.

Designing Scenery From a Map

If you want to create a country, from a map, you are best to first start by making a block-pattern, alternating sea and land, so you can easily find the coordinates of the tiles. Use the finest resolutions to make the scenery more realistic. Now you can compare the coordinates you found with those on a map and decide which tiles will be land and which will be sea or other area or coastline. When you know which tiles are land or sea you can start laying them out. After that, you can look where rivers can be situated, etc. Take care that you don't use too many different types of land, because it can have a dramatic effect on your frame rate (the speed at which the scenery is redrawn on your screen). The most difficult are oblique coastlines where you must lay out a couple of straight coastlines and after that a bend, and so on.

Finally you must integrate the airports made with the program Airport in the last few issues of the magazine. If you take a look at the SCA-file, you will see a section with the synth and block-commands. Copy this part to the file you are working with, you can exchange it without any problems, and make sure there isn't any terrain that is laying above those tiles made with Airport. Airport places around the reference point 3x3 tiles, so that way you can find which row and column-number are with which coordinates. Last, you can adapt the altitude of the tiles around the airport to make a smooth transition to other airports. And then finally, you can follow coastlines, rivers, and mountains to fly from one airport to another airport.

About the author - Matthijs Becker is an avid flight simulation enthusiast living in the Netherlands. If he is not flying, then you'll find him designing scenery for his native homeland. He can be reached via email on the Internet at L.J.Becker@inter.nl.net. [MW✈]

FLY TIPS

Course Reversal 45/180 Method

You've just passed over a navigation aid and want to turn around and return on the same radial. The 45-180 method is a version of the procedure turn shown on many terminal approach plates (example: The Paine Field approach plate shown on page 249 of the FS5.1 Pilot's Handbook). A simple method of doing the procedure turn is to do a standard rate turn for 45 degrees, fly for one minute, then do a standard rate turn for 180 degrees and fly to intercept the desired navaid radial. ***[MW✈]***

THE FLIGHT DECK
Simulating Airliners

Lago's new Airline Simulator

Since about 1993, "Flight Assignment: Airline Transport Pilot" (ATP) users assumed that the ATP program would be updated to keep up with "Microsoft Flight Simulator." That did not happen due to a variety of reasons-mostly managerial and bureaucratic in nature at subLOGIC (the maker of ATP). subLOGIC was absorbed by Sierra to (we all thought) ensure ATP's final demise. Fortunately, before being absorbed by Sierra, subLOGIC entered into an agreement with LAGO of Italy allowing them to sell a "European only" version of ATP that we now call "Airline Simulator" (AS). AS continues the ATP tradition of having features that are STILL not found in any version of "Microsoft Flight Simulator" such as real ATC voices (unless you purchase add-ons like Flight Shop), etc. AS is not so much a successor to ATP, as it is a "bridge" to other future programs that Simon Hradecky and others may develop in the future.

AS is a DOS program and is, basically, ATP Revision E (first released October 1993 by subLOGIC) with European and North Atlantic scenery, ATC, and NavAids added in. The only aircraft provided with AS as of right now is a "glass cockpit" 747 with an improved flight model compared to the "ATP" 747. The AS paper manual is printed in four languages-English, German, Italian and French. The same comment applies to the interactive Windows manual.

Requirements

- An IBM compatible PC with a 486DX/33 or faster CPU.
- 4MB or more RAM, with a minimum of 590KB free conventional DOS memory (617KB to open second view window and map views) and at least 560KB free Expanded memory (EMS).
- DOS 5.0 or higher. AS, like ATP should also run as a DOS application on OS/2 through version Warp 4.0.
- Any version of Windows to run the interactive manual.
- 25MB of free hard-disk space.
- Multimedia: CDROM, SVGA 256 color monitor, 100% SoundBlaster compatible soundcard.
- Mouse and a Windows installed printer to print sections of the manual or approach charts.

The system used for this review is a clone Pentium 133 mhz (ASUS motherboard/Award BIOS) with 16MB of RAM, ProAudio Spectrum 16 soundcard, Cirrus Logic model 5426 SVGA/1MB video card, and an NEC 2X IDE CDROM drive.

What's in the box?

A single CDROM, a 30+ page paper manual and a two sided, large paper map with Europe on one side and the North Atlantic on the other. The CDROM also contains shareware versions of Win Planner, Simon Hradecky's ATP Utilities (ATPUTIL), and a LAGO product demo slide-style showcase.

Installing the Program

The main setup program runs from within Windows. A DOS-level-only installation batch file is provided that installs only the AS program itself and various DOS utilities. **Without a version of Windows, you lose use of the AS Interactive Manual.** From this manual you can print key pages and approach charts. There is no DOS version of this interactive manual. The Windows setup program also installs various ATPUTIL files for use with AS. Note: LAGO has also recently released several .IAP approach chart files for AS that are compatible with "Final Approach." The program installed in less than 15 minutes for me via Windows 95 and set itself up with the AS program group containing these items: AS, AS Configure, AS Manual, European routes, North Atlantic routes, a "Route Randomizer" for transatlantic routes, ATPUTIL, and ATPVoice shareware program icons.

Note: The AS Configuration program does allow users to configure the program for their specific video card to include a "VESA v1.2 compatible" mode that works with the included copy of UNIVBE.

Running The Sim

Airline Simulator ran well from an ordinary DOS prompt. Generally, AS will also run well from an icon in an AS program group from within Windows 95 (depending on your specific video card). If AS will not run from Windows 95, users can try running it via the Windows 95 "MSDOS Mode" or even a bootup DOS prompt. Flying single or career assignments between European cities and on transatlantic routes worked in the same manner as flying ATP between US cities.

New AS users that have had no ATP experience will have trouble flying assignments because, at least in AS Version 1.0, there is no useful documentation detailing the exact sequence of events the "pilot" must perform to actually fly an assignment. To rectify this problem I wrote and posted a "How To" at my website noted below. The version 1.15 update includes many more text "readme" type files explaining much more of the details of AS and included programs.

AS itself runs fine as a DOS applica-

tion within Windows 95 BUT WILL NOT RUN from within Windows 3.1 due to, I assume, some video mode handling incompatibilities with Windows 3.1 and memory. The paper manual specifically discusses this fact and directs you to exit Windows 3.1 and run AS from the DOS prompt. The AS Interactive Manual runs well from any version of Windows.

Veteran users of ATP, especially those who have the "3D-AGS" or "ATP Companion" will be quite familiar with the AS 747 cockpit, panels and keyboard commands. LAGO includes a utility to blend together an existing ATP+3D-AGS installation with AS called ATP2AS. Veteran ATP users have also determined other ways to blend ATP and AS. Users new to the "ATP World" may have trouble figuring things out at first. The program starts with a demo (just like ATP did from LAX to SFO) flight from Madrid, Spain to Munich, Germany that can be viewed in part or in it's entirety. There is no real "pilot training" included in the package.

The scenery is similar in "look" and performance to FS4 ASD visual scenery (polygon based) — in other words you don't have to sweat the frame rate! The instrument scenery is quite complete (all VORs, NDBs, and ILSs) for the areas covered by the visual scenery. By using the AS Windows icons or included DOS programs, you can easily switch between European or North Atlantic career flight and routes packages.

The 747 has a more accurate flight model and external visuals than the old ATP version, and has not only a "glass cockpit" with a fully-functional primary instrument panel, but also a photo-realistic, operational secondary panel. The default video resolution of AS is 640X400 with 16 or 256 colors and "3D" effects with optional (extra cost from LAGO) 3D glasses. 800X600 drivers for specific video chipsets/cards will be sold as an enhancement by LAGO. A coupon for both is included in the package.

My Recommendations

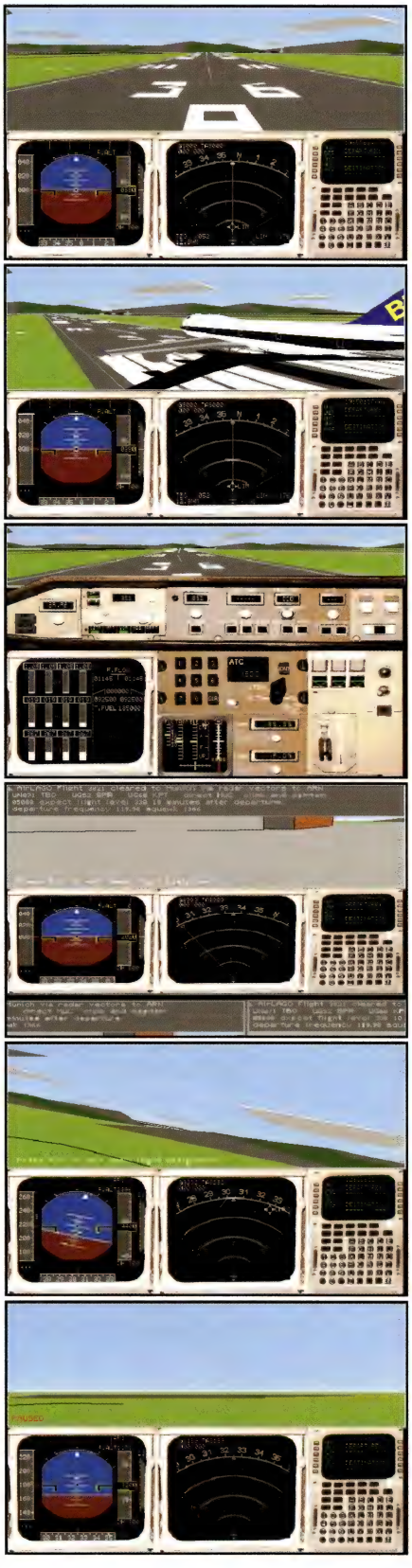
The initial version 1.0 release of AS was marred by some notable bugs. However, a significant upgrade/patch to AS (to make it into version 1.15) was released by LAGO this past February. I suggest in the strongest terms that users not fly AS without being sure that they have version 1.15, and if they do not, then download or order the version 1.15 upgrade (the upgrade can be downloaded from the MW website).

As with the prior ATP, if you are new to virtual aviation and just want a flight simulation to "putt around" and "eyeball" visual scenery, then AS is NOT for you! You will want to have an idea about what a VOR, NDB, or ILS is before buying AS since it assumes you know about such things and the basics of navigating with them.

If you are looking for a flight simulation that has real voice ATC and dialog with ground and tower controllers, tons of airports and NavAids, and many challenging (graded!) career assignments to fly-by, then by all means buy AS! If you already own ATP, especially ATP+3D-AGS+USA East/West scenery, then I would recommend that you still buy AS to acquire the latest version of ATPUTIL and all the new European scenery to fly with. There are a variety of ways to blend together AS and ATP+3D-AGS aircraft and sceneries. For more detailed information and tips about "Airline Simulator" and ATP-visit my "ATP/Propilot corner featuring Airline Simulator" website at:

`www.erols.com/fsnews/news/atp.html`

About the author - Mark Stotzer is currently a customer support/training engineer for a computer firm in Salinas, California. His background includes 23 years of experience in U.S. Marine Corps aviation maintenance and logistics of A6A, A6E, EA6A/B, HH46, UC12, and CH53E aircraft types. A veteran of the "Gulf War", he retired from active duty in 1994. His first computer was a kit-built Heathkit H-89 constructed during 1982. His favorite flight simulation program is Flight Assignment: ATP with 3DAGS. He can be reached via email at stotzerm@ix.netcom.com. [MW✈]



BUILDING YOUR OWN COCKPIT

A continuation of the original 5 part series

Skipping Down Junk yard Lane

...or...

Integrating Real Aircraft Parts Into Your Cockpit

Once you have built a cockpit, the next step is to figure out how to enhance its realism, or at least bring more of the look and feel of real-world aircraft cockpit interiors into your cockpit. One of the ways to do this is to install parts from a real aircraft – an obvious suggestion, but just how do we integrate them with the cockpit so they are not just decorative items?

We have started this next step in our very own cockpit that we built just over a year ago. We first revamped and re-engineered our throttle quadrant's interface to the simulation. We then added the following real components: Gear Switch, Magneto Switch w/key, overhead lighting panel, overhead air conditioning vents, and illuminated seat belt and no-smoking signs! We'll tackle most of these one at a time below. If you want your cockpit to have working lights and other items that actually need some form of electric current, we recommend using a 12 volts DC system. You'll need a power supply that can provide you this kind of relatively safe current. Be sure to get one with enough power (amps) to drive everything you want to hookup.

Throttle Quadrant

If you pick up a throttle quadrant from an aviation junk yard, the hardest task will be integrating it into your cockpit so that it can actually control your throttles, prop blade angles, and mixtures (and trim too if yours comes with a trim wheel!) R&R Electronics' EPIC card (see Commercial Member Directory for contact information) is the most popular and flexible solution for achieving this integration goal. All it requires is wiring some simple linear potentiometers (fancy term for a slide pot – like those found on stereo equalizers) into the EPIC card (as easy as hooking up just 3 wires per potentiometer). What is really more difficult is hooking the potentiometers to the throttle quadrant itself.

Originally, we chose to use short, threaded rods to push/pull the potentiometer lever as you move the throttle's lever back and forth. We found some drawbacks in this method in that on most throttle quadrants, the arm from the lever that sticks out enough to connect the rods, are at different angles and/or sizes. This leads to an uneven application of power if you use two or more throttles, since each lever will be moving the potentiometers different amounts of travel (due to the uneven attachment points). Because of this, the only we could be sure to add equal power to each engine (as in the Learjet), was to watch the engine guages. How nice it would be if we could rely on the relative positions of the throttle levers themselves!

After experiencing the above drawbacks, we chose a different method where by we use steel wire attached to the throttle lever and then run the wire through small pulleys to the potentiometer's arm. Figure BYOC.1 shows a diagram of our throttle system (for a twin engine quadrant) from the front and side. To be sure the potentiometers all move in perfect relation to each other, we drilled a hole at the exact same height on the throttle levers to connect the wires by. The steel wire makes a complete circle – from the potentiometer to a pulley, up to the throttle lever, back to another pulley, and finally back to the potentiometer. This allows the throttle lever to move the potentiometer's arm forward or backward as you move the throttle up and down. We have now implemented this method and it works

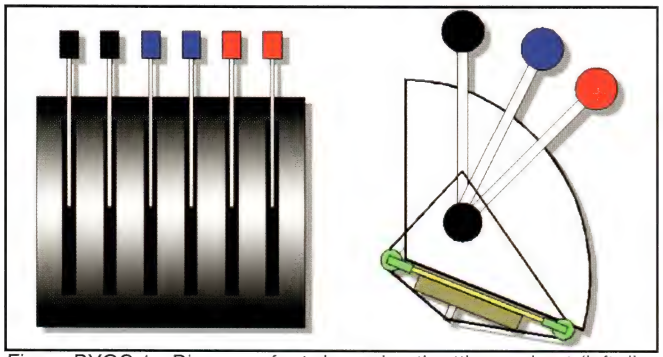


Figure BYOC.1 - Diagram of a twin engine throttle quadrant (left diagram is from the front, right diagram is from the side with cut-away showing how wire is strung in a full loop from the slide potentiometer to the throttle lever. You will need a slide potentiometer for each lever in your quadrant.

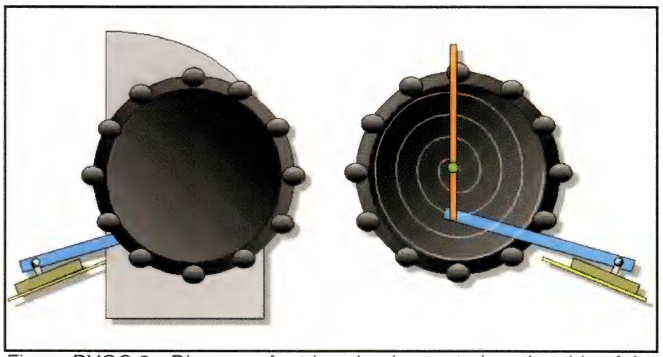
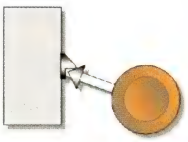


Figure BYOC.2 - Diagram of a trim wheel mounted on the side of the throttle quadrant (left diagram is the view from the side, right diagram is the view from the other side with quadrant removed). Ever largening circles normally drive a pin indicator. Adding a small flat bar allows it to also drive a slide potentiometer to control trim in the sim.

quite well. It is also much easier to maintain since the only moving part to wear out is a cable. If it snaps, you just wire in a new one. We had this happen at the last MicroWINGS conference, and within just five minutes, we had the quadrant back up and working again. Figure BYOC.2 shows how a Trim wheel looks, works, and how it too can be hooked up to the sim via the EPIC card and another slide potentiometer.

Gear Switch



This is by far the easiest of real-world aircraft parts to install. For added effect, be sure to find one that has two sets of electrical connections on it (6 terminals total). If you use one of these, you can have the first set control your landing gear in your simulator while the other set can control the illumination of red and green lights to denote gear up/down as in a real plane. Be sure to get a real gear switch rather than just a regular switch (like from a Radio Shack or other source), since a real switch will have a lock on it that requires you to pull the switch out and up to get the gear up (a safety feature to prevent you from accidentally raising the gear). This extra action needed to raise the gear adds more realism than you might first think! Figure BYOC.3 shows the wiring diagram for the back of a real gear switch. Note that in the wiring diagram, we only use two of the terminals for the connection to the EPIC card. That is because the EPIC can detect the closing and the opening of the circuit. A separate connection for down gear is not needed. If the EPIC detects up, it sends the Gear Up keystroke. If it detects that the up is no longer up, it sends the Gear Down keystroke.

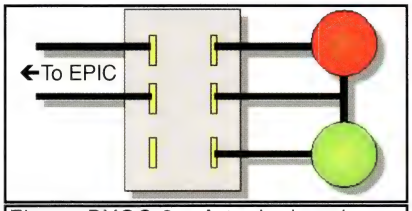


Figure BYOC.3 - A typical real gear switch will have two sets of contacts so you can wire lights to it also.

Ceiling Lights

If you enclose your cockpit, you will need to install some kind of overhead lighting in order to illuminate the interior. Any light will work – but – we highly recommend using 12 volt DC lights for the relative safety that working with low voltage DC current provides. Air Nostalgia in Dallas (a local aviation memorabilia store), frequently has airliner overhead panels for sale. They run anywhere from about $35 to $150 per panel. Each panel is usually complete – including drop down oxygen masks, adjustable lighting, adjustable air conditioning vents, and illuminated no-smoking/fasten seat belt signs. You should plan on purchasing replacement light bulbs for the entire panel, since most aircraft operate on 22-24 volts DC. Radio Shack has replacement 12volt bulbs for the reading lights in the panels.

Overhead Air Vents

Any enclosed cockpit will quickly get warm on the inside due to the heat produced by the monitors, computer(s), and the hot air from the pilot's tall-tale stories of aerobatic feats! So, you are going to need some form of active ventilation in your cockpit. Finding real aircraft style vents (with the adjustable angle and twist on/off mechanism) is easy if you purchased the overhead panel mentioned above in the section on Ceiling Lights. With the panel, you also get three direction and flow adjustable air vents (most of the panels are from gutted out or cargo converted Boeing 727's). To drive air through these vents, you will need to hook up some 12 volt DC fans or a hair dryer (with the heating element off, disconnected, or removed). We used two fans mounted onto a home-made duct system comprised of rubber plumbing and aluminum ducting parts (Y adapters to merge the air flow, reducers, and basic ducts). For extra measure, we also used two more fans mounted on the back of the cockpit 'fire-wall' to draw air out of the cockpit. Thus if the air conditioning vents are blowing in, and the fire-wall fans are blowing out, then a nice flow of fresh air will be achieved. The fire-wall fans also help the efficiency of the vents by creating a forced draft of air out of the cockpit. All the fans should be driven on/off by switches (illuminated would be even better to show that these are controlling DC powered items) to add more working 'gizmos' to operate in your cockpit.

Seat belt / Smoking Signs

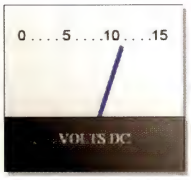
Another easy, yet very nice, touch is to install a pilot controlled – illuminated 'Fasten Seat Belts' and 'No Smoking' signs. Again, as with the above vents, if you purchased the overhead panel described under Ceiling Lights, you will have an illuminated sign. You can remove the sign quite easily and mount it into your cockpit panel. Place the sign high so that your virtual passengers can see it (or if you are really into it, your kids who you have seated in the row of seats you lined up behind yours!) As with the Ceiling Lights, you are going to need to swap out the bulbs for 12 volt versions. While the signs are really for looks only (they do not interface with your simulator software), they really add a nice touch and of course give you more working buttons, switches, and all that to operate.

Hobbs Meter

All general aviation prop planes contain a meter that counts how many hours the engine has run for (exactly like the odometer on a car tells you how many miles it has driven). Since a Hobbs meter is so easy to install and needs no interfacing to the simulation, why not add one to your cockpit. The most well known brand of these meters is produced by Hobbs – in fact many people call

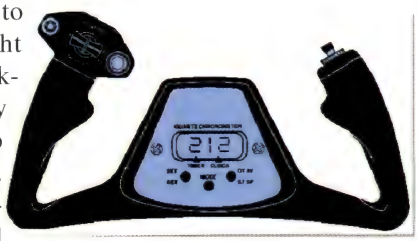
these meters Hobbs meters since they are so widely used. Just drill a hole to fit the meter, hook up some 12 volt DC power, and you have just added to the realistic look of your cockpit and added a way of measuring how much time you have flown in your cockpit.

Volt Meter



Since your cockpit's moving guages and instruments are really going to mostly be in your monitor and not your cockpit panel, any working gauge you can add will enhance the look and feel of the cabin. An easy item to install, since we are using 12 volts DC current to operate all the lights anyway, is a DC Volt Meter. When you turn your system on, the meter comes alive and shows you the voltage level. It is also a good thing to have anyway so you can monitor the voltage and if it drops or rises significantly, you know you should immediately shut down and find out why it is fluctuating!

Yokes



If you took the time to make your own flight controls for your cockpit, then you are really missing out if you do not use real yokes. They give you, obviously, the feel of a real grip. They can also be modified to have electric trim switches, push to talk switches, etc. Some yokes can even be found with built in chronometers/clocks for timing precision turns, holding patterns, etc.

The above items will be a good start for you and your cockpit. Figure BYOC.4 lists some sources and (if applicable) part numbers for items mentioned in this issue's column. Best of luck, and ***please*** send us photos of your cockpit (during construction and after!) so we can possibly print them in a future issue of the magazine! *[MW✈]*

Figure BYOC.4 - Sources

- ✈ Yokes, Throttle Quadrants, GA A/C Parts
  - ➢Your local aviation salvage yard
  - ➢Air Salvage of Dallas/TX, tel. 972-227-1111
- ✈ Overhead Panels w/Lights, AC, Illum Signs
  - ➢Air Nostalgia, Grapevine/TX, tel. 817-481-9005
  - ➢(Around $35-150 per panel)
- ✈ Special Bulbs, Switches, Fans, other parts
  - ➢Newark Catalog, Chicago/IL, tel. 773-784-5100
- ✈ 10amp, 12VDC, Power Supply
  - ➢Radio Shack, P/N RSU-11669678, $79.99
- ✈ Order the back issues in which we ran a 5-part series on building your own cockpit, Issues V2N3 through V3N1 (V2N3 is sold out, but is up on our website) and recently V4N5 & V4N6.

COMPUSERVE

Your Electronic FBO

by Greg Hannigan

A Day In The Life

I received an Internet Email the other day from a column reader who said "I saw your picture in the FSFORUM Staff Photo Gallery – what a pity you're married!" Oops, that's not the email I meant to mention here - sorry. Actually, the email I was thinking of was one from a flight sim enthusiast in Europe. He wanted to ask me a little more about FSFORUM.

"Ok, so I understand that there are message boards and file libraries," he said. "I've also read that you sometimes stage these events called Fly-Ins, and other events called Rallies. But what else happens at FSFORUM? Do you just get simple questions posted by new flight simulation fans, or is this a place where only 'power users' hang out?"

Actually, the answer is "both". We seem to attract a lot of new members who are new to both the world of CompuServe **and** the world of flight simulation. Typically these members will have what could be considered simple questions – like "I've downloaded scenery from the library – now how do I use it?" or "How can I edit an aircraft that someone else has created?" We have a pretty healthy complement of staff members who gladly answer these kinds of questions. But FSFORUM is a wonderful place for the "power user" as well. It occurred to me that day to ask myself the question – just what are we talking about lately on FSFORUM?

So I browsed through the messages currently on the board and was fascinated by the different topics being discussed. One member posted a message announcing a new Easter Egg he had found in MS Flight Simulator 95, one that I myself didn't know was there. Apparently, if you set your FS time and date to 12 noon on December 17, 1903, set the Scenery Complexity to "Very Dense", and set yourself up precisely at the coordinates N036 01 10.8108, W075 40 45.7032, heading 104 with an elevation of 3ft, you'll see the Wright Brothers' Kitty Hawk. Sure enough, there it is!

The expertise on FSFORUM doesn't just come from its staff… as a matter of fact, most of it comes from the plethora of knowledgeable members that come by frequently. One new member had trouble understanding how the HSI instrument on the FS95 737 instrument panel worked. His question was answered by a another member who not only supplied him with one of the clearest, most concise explanations I've ever seen on the topic, but later uploaded a help file to our MS Flight Simulator library containing a full description *and* some graphic examples depicting the HSI in action. This kind of occurrence highlights what I've always believed – the membership of FSFORUM is its biggest asset!

So whether you're brand new to general aviation flight sim-

ulation or you've been enjoying it since the earliest, crudest versions of Microsoft Flight Simulator... or if you're somewhere in between and you'd just like to talk about your favorite hobby with those who consider it the same, stop by and join us!

About the author - Greg Hannigan is an Associate Sysop on CompuServe's FSFORUM and a long-time flight simulation fanatic. He can be reached online or via email addressed to 105277.1330@compuserve.com - drop by the forum and say Hello!

by Simon Hradecky

Flyonline

Saturday afternoon, 15 UTC, is flyonline time on SIMGAMES. The Conference room comes alive. Today we are going to fly into Innsbruck, Austria. Most of the aircraft will takeoff at Salzburg, one coming in from Vienna (all Austria). Approach procedure in use will (because of weather) start at Kühtai NDB at 13,000 feet, intercepting Localizer West shortly afterwards at 11,500 feet, then descend on (offset) localizer at heading 066, that guides the airplane south of the runway 8, that will be passed. About 4 miles after the runway Absam NDB marks the turning point back into runway 26, where the aircraft has to go visual in a very tight turn to the right - turning about 220 degrees - onto extended center line of runway. This procedure is at least as challenging as Hong Kong's Approach.

"Innsbruck Tower, Olympic Airways 203, B737, overhead Salzburg VOR, inbound to Innsbruck". "Olympic 203, good afternoon, descend to FL100, expect runway 26 via Kühtai and Loc West". On the radar screen the controller sees an aircraft doing 440 knots ground speed at FL250 just passing SBG VOR. Shortly after issuing the command he sees the aircraft turn and start descending.

In the meantime at Salzburg Airport: "Salzburg Tower, Austrian 154 ready for taxi". "Austrian 154, taxi to runway 16, expect Rattenberg 2V departure". "Rattenberg 2V". "Salzburg Tower, NOMIS 1 ready for departure" (you guessed it, that was me, flying ATP's upcoming MD-83!). "NOMIS 1, taxi to runway 16, expect Rattenberg 2V departure". "Roger, Rattenberg 2V, NOMIS 1". Shortly afterwards, "Salzburg Tower, Austrian 154 ready for departure" "Austrian 154, cleared for takeoff 16". And there she went, taking off southbound. Southbound? There are mountains! In front of the runway the Salzach valley narrows more and more and builds finally into quite an obstacle to aviation. A bit right of the departure path, the "Untersberg", being over 6,000 feet high, looks like a big concrete wall. Well, the procedure describes a circling departure. Shortly after takeoff turn to the left until intercepting the NDB SI (which also marks the middle marker for runway 16) at heading 310. After passing SI continue on directly to Rattenberg NDB, about 20 miles ahead of Innsbruck.

"Austrian 154, turn to the left please, you are going to crash into Untersberg!" ... ATC is getting nervous as it looks on. Austrian 154 turned to the right ... Didn't they read the departure maps? Ahh, now the blip turns to the left, danger is avoided. "NOMIS 1, align onto runway 16 and hold". "Align with runway and holding, NOMIS 1". In the meantime Austrian 154 has reached SI. "NOMIS 1, cleared for takeoff runway 16". "We are rolling, NOMIS 1". And off I went, at 500 feet AGL I turned left, 160 knots IAS, 30° bank and finally rolling out nicely aligned towards the SI NDB.

"Austrian 154, climb FL110, switch to Innsbruck Tower, channel 2", ATC commands. "Austrian 154, Climbing 110, channel 2" the read back comes promptly. Shortly afterwards, "NOMIS 1, climb flight level 110, switch to Innsbruck Tower, channel 2". Reading back I push the throttle levers forward and climb to FL110, while switching to channel 2 simultaneously. I notice Olympic Airways 203 just now being cleared for Localizer West Approach into Innsbruck, after establishing contact. Immediately I request runway 26 with Loc East procedure, so that I don't need to fly from Rattenberg to Kühtai first, but can intercept the opposite localizer (which is also an offset localizer) directly from Rattenberg. ATC tells me to expect that approach. So I tune Loc East, slow down, request descent to 9,500 feet and get cleared to intercept localizer. Shortly after Rattenberg, already watching the localizer come alive, Innsbruck tower is told: "Olympic Airways 203, executing missed approach". Ouch! Now my track is blocked. Olympic will come straight opposite to me, using reciprocal LOC East to climb out of the narrow valley. And immediately I hear "NOMIS 1, climb 13,000 feet, fly direct Kühtai". "Roger, climbing 13,000 feet, direct Kühtai, NOMIS 1", I reply. Putting flaps in, I accelerate and climb. I am just north of Innsbruck aerodrome, when engine #2 decides to quit. "Innsbruck Tower, NOMIS 1, we have lost an engine". "NOMIS 1, roger, are you able to descend to 11,500 feet within one minute?" "Affirm". And I dive under the other traffic (Olympic Airways after their go around), and get cleared for the localizer approach.

Flying the vertical profile as indicated in the approach map (no glideslope indication available on this Localizer!), I descent to 5,000 feet, reach Absam NDB doing 140 knots in full landing configuration (full flaps, gear down, speed brakes armed), bank the aircraft 30 degrees to the right and turn back to 210 degrees to intercept the runway 26 visually. Reaching the centerline I turn left to fully establish final. Then I pull the throttle levers to idle and descend towards the runway. After a smooth touch down I pass the taxiways, so that I have to backtrack the runway before taxiing off the runway.

"NOMIS 1 has vacated the runway". "Austrian 154, cleared to land 26" ATC immediately replies ... Whew, that was close separation! Shortly afterwards Austrian makes it onto the ground, followed by Olympic, which got some extra practice in flying by holding at Kühtai NDB for a while in the meantime.

All the above happened in a real Online Session a few weeks ago - I just grabbed three planes out of 10 usually crowding the skies each week. Each Saturday, 15GMT, you are able to join a scheduled online event, regardless of where you are in the world. Areas we have flown online in the past have been Innsbruck, San Francisco, Los Angeles, Hong Kong, Amsterdam, Frankfurt, and many other exciting airports. Remember, the virtual skies are open 24 hours, 7 days a week, so that you too can fly any area you like! Join the fun, too. Visit us on Simgames to experience real, multiplayer, ATC controlled on-line flying!

About the author - Simon Hradecky is a sysop in the SimGames forum, developer of ATP related utilities and products (including ATPUTILS and 3d-AGS), and president of Nomissoft. He can be reached via email at 100031.336@compuserve.com. [MW✈]

THE PILOT SHOP

Hot Download Files For Flight Sims

(pictures on next page)

A note about location of files - The locations listed in this column indicate a confirmed source, but they may usually be found at other web sites or on-line services such as CompuServe, MSN, or AOL.

B57COA.ZIP (Bytes: 100kb)
Author: Frank Cunningham
Location: http://wings.ark.com/ - fs5 page, FSFS Aircraft button

This is but one of dozens of aircraft created recently by Frank Cunningham. It appears that he has been very busy producing various versions of the Boeing 737 and 757 in the colors of several airlines. Frank seems to enjoy recreating the distinctive markings applied to the "flying billboards" of Southwest Airlines and Frontier Airlines, but has done many others as well, such as this sharp-looking Continental Airlines Boeing 757-200.

260PNL95.ZIP (Bytes: 178kb)
Author: Angelo Moneta
Location: http://intercity.shiny.it/moneta
Requires FS6 and at least 800 x 600 screen resolution

One of the pioneers of FS5 panel design has turned his attention to FS6. Angelo Moneta has given us a new instrument panel for single-engine propeller aircraft, in this case the SF 260 Italian military primary trainer. As usual, the panel features full functionality combined with realistic and attractive graphics. This panel is Postcard-ware. After you try it, send Angelo a postcard with your comments!

NNJ10B.ZIP (Bytes: 248kb)
Author: Justin Tyme
Location: http://wings.ark.com/ - fs5 page, Scenery button
Tested successfully with both FS5.1 and FS6

Justin Tyme has done it again! His latest creation is Northern New Jersey, which features airport buildings, rivers, roads, and textured 3-dimensional landscapes (as usual). All of New Jersey north of I-95 is modeled and this scenery has been designed to mesh with his Pennsylvania scenery (see MW Vol. 4 No. 5). Twenty-two airports are included along with exclude files to allow it to be used with either the default or CD-ROM New York City scenery.

737LANCH.ZIP (Bytes: 113kb)
Authors: Brian Quayle, Mark Robertson
Location: http://www.agt.net/users/mapi/markhome.htm

Brian Quayle's .afx files have been available for repainting for some time and many have done so. Mark Robertson's LanChile 737 is one of the most accurate and attractive so far. As Mark notes, this is the perfect aircraft to use if you're visiting Easter Island off the coast of Chile as LanChile flies scheduled flights there.

CONCRDAF.ZIP (Bytes: 71kb)
Author: Steve Barnes
Location: http://wings.ark.com/ - fs5 page, FSFS Aircraft button

Are jumbo's just a little too slow for you? Try one of Steve Barnes' new Concordes! Besides the Air France example pictured, Steve has created the prototype and a British Airways version. A nice touch is the "droop" nose that lowers when the flaps are selected down. Like many supersonic aircraft, this Concorde suffers somewhat from stability problems at high speed and high altitude, but this is more a fault inherent in Flight Simulator's atmospheric model than with Steve's aircraft and can be minimized by remaining below 40,000'.

FUELCALC.ZIP (Bytes: 14kb)
Author: Brian Feldman
Location: http://www.enter.net/~feldmanbd/
Requires Flight Shop (or the converter for FS6)

Here's a handy little Flight Shop adventure that provides a continuous read-out of fuel usage and range remaining. Just like a Flight Management System, the values change according to fuel flow and you can immediately see the effect on range by varying the RPM setting. The source file is included, so you can easily add this module to any Flight Shop adventure.

AJM_MD83.ZIP (Bytes: 168kb)
Authors: Project Freeware Group
Location: http://wings.ark.com/ - fs5 page, FSFS Aircraft button

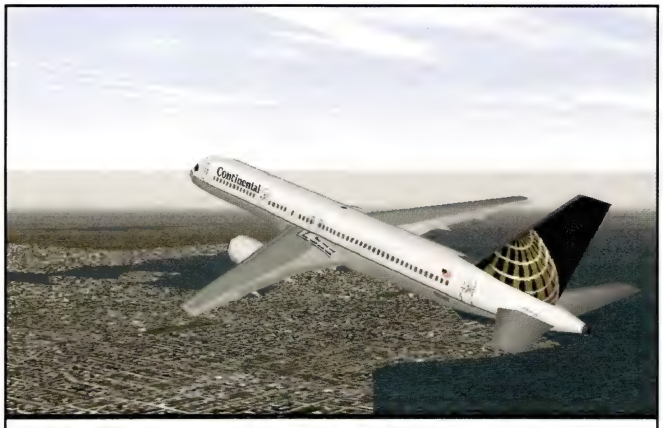
Aircraft designers Chris Grall, John Keane, Ilkka Tahvanainen, Frank Cunningham, Carl Zoch, Ed Schlatter, and Kim Simmelink have formed the Project Freeware Group. In the past few months, the Group has produced some 60 different versions of the Boeing 767. Now they have turned their attention to the MD-80 Series of aircraft. While one designer can create several aircraft, the secret to the Group's success is to start with a great .afx file and then expertly repaint it in the colors of dozens of airlines big and small, creating an unparalleled selection.

SCEBERM.ZIP (Bytes: 412kb)
Author: Chris Wilkes
Location http://wings.ark.com/ - fs6 page, scenery button
For FS 5.1 CD and FS6

The island of Bermuda was unaccountably left out of MS Flight Simulator, but Chris Wilkes has rectified the situation with this rendition. The scenery features not only a detailed Kindley Field, but accurately drawn coastlines, beaches, and textured 3-dimensional terrain. The textures represent the characteristic brightly-colored houses on the hill-sides. An interesting and unusual feature is the presence of simulated humans on the ramp in front of the terminal. I didn't see the "Swizzle Inn", though!

About the author - Eric Mitchell is a web site designer, aviation artist, and former Maritime Patrol Navigator who enjoys flying Flight Simulator as well as designing Flight Shop aircraft and scenery. He maintains the wings.ark.com web site and introduces some of the newest and most interesting files in this column. Eric can be reached via e-mail at mitchell@mars.ark.com.

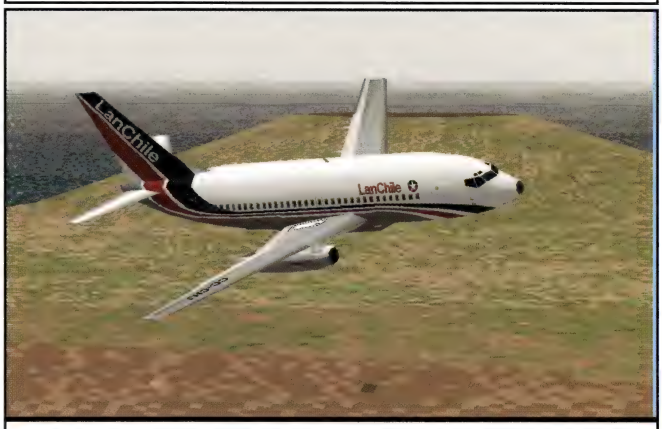
If you do not have a modem... MW can provide you with whatever files you are wanting (provided we have the author's permission to distribute their files). Contact us via tel., fax, or mail for file availability, ordering information, etc. For this service, we charge $5 per disk (USA) or $8 per disk (Int'l). Note that this is a per disk charge, not a per file charge. A disk is a 3.5", 1.44 MB floppy. If more than one file will fit on one disk, then you only pay for one disk. *[MW✈]*



B57COA.ZIP - Continental Airlines Boeing 757-200 by Frank Cunningham.

260PNL95.ZIP - Replacement single-engine prop panel for FS6.

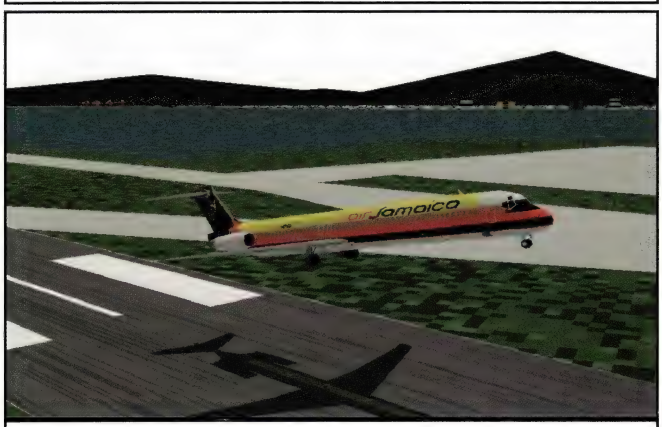
NNJ10B.ZIP -Newark New Jersey by Justin Tyme.



737LANCH.ZIP - LanChile Boeing 737-200 repainted by Mark Robertson.

CONCRDAF.ZIP - Air France Concorde crossing the Atlantic.

FUELCALC.ZIP - Handy fuel calculation adventure module with source.



AJM_MD83.ZIP - Colorful Air Jamaica MD-83 in the Caribbean.

SCEBERM.ZIP - Passengers await the boarding call at Kindley Fld., Bermuda.

'Review Of' ...Laminar Research's X-Plane

One of the most interesting and exciting simulation products, in my memory, has been installed on my hard disk for the past 2 weeks courtesy of Laminar Research. Mr. Austin Meyer wrote and compiled X-Plane, Plane-Maker, and Part-Maker over the past 8 years.

Austin obtained his private pilots' license in the summer of 1986 in Columbia, South Carolina. By 1988 he had acquired a few hundred hours and a reputation as a very good (and "by-the-book") pilot among his friends and flight-instructors in South Carolina. To work for an aerospace engineering company over summer break from college, Austin spent the summer of 1988 in the San Diego, California area. The entire flight environment of that area was so much more intense and demanding than in the south-eastern states that Austin did something that he and his friends thought was impossible... he failed a recurrency check-ride! At that moment, Austin vowed to write a flight simulator that would never leave him unprepared again. It would have to include realistic flight dynamics, hugely variable weather dynamics, and good enough scenery for the simulator to "feel" like the real thing.

Along the way, X-Plane acquired an eye-popping three-dimensional scenery database for the entire country, a navigational database including over 3,000 airports and over 5,000 navigational facilities, data output functions for engineering work, and an extremely user-friendly set of programs (Part-Maker and Plane-Maker) for entering aircraft designs into the simulator.

I have been, for a decade and more, a dedicated user of almost every flight simulation product to hit the software market. The original FS1 to the current FS95, from IFT-Pro to the upcoming and soon to be released 747-400 Precision Simulator(reviewed by me in the last issue of the magazine) are either still on my hard drive or are in archived format on the all too familiar blue ZIP drive 100 meg floppies.

X-Plane is a major addition to the flight simulation market and is very unique in its completeness. The package includes 3 full fledged programs, X-Plane the flight program, Part-Maker the design program, and Plane-Maker the final assembly program. X-Plane is both a fixed wing and a HELICOPTER program. All are included on one CD-ROM disk and can be upgraded through access to Laminar Research's Web page, located at www.x-plane.com. Of course it is also easy to reach this area via the links located right on the MicroWINGS website by simply selecting Other Cool Sights/Laminar Research! My edition of the CDROM included Ver2.0 and I have now upgraded to Ver 2.6 at the Laminar Web site, that edition having been released on January 26th, 1997. An even later 2.71 upgrade was available as we went to press.

The 2.71 upgrade includes the following enhancement and new since version 1.0:

- 800x600 resolution
- better new cockpits (higher-resolution HSI, VVI hold autopilot, etc.)
- directional-gyro drift
- more instrument and engine failure modes and control
- artificially-intelligent ATC for the ENTIRE COUNTRY

Figure XP.1 - A dusk flight into an airport with high terrain to the southwest.

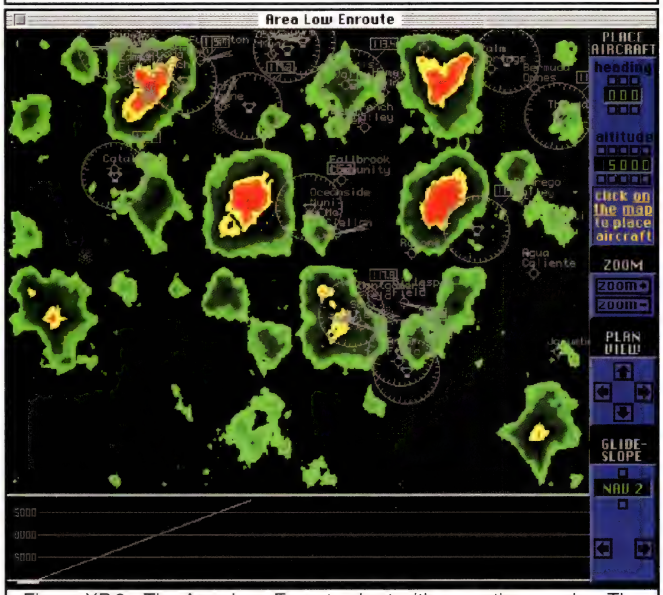


Figure XP.2 - The Area Low Enroute chart with a weather overlay. The user can click anywhere on the map to place his aircraft there.

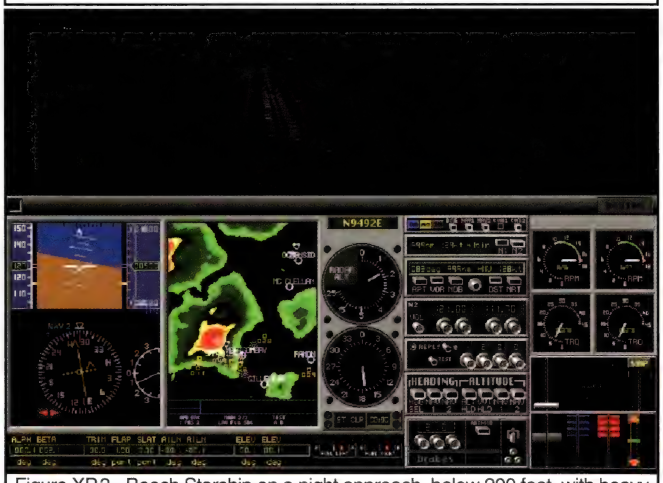


Figure XP.3 - Beech Starship on a night approach, below 200 feet, with heavy thunderstorm activity in the area. Note the glass cockpit display for navigation.

- visible dynamic air traffic
- fuel management
- payload and jettisonable-load weight management
- ability to fly helicopters and airplanes
- easier-to-fly helicopters with custom high-visibility cockpits
- buildings with helipads on top to land on
- frigates rocking in the waves with helipads on the back to land on
- Plane-Maker drops into helicopter or airplane-making mode
- pseudo-random fractal-based thunderstorm generation... including rain, turbulence, and reduced visibility when in weather
- on-board weather radar (coupled to thunderstorms of course)
- radar-summary chart (coupled to thunderstorms of course)
- plates and charts can be zoomed, like on Jeppesen/Elite
- 3-D flight-path plot... must see to believe... look at it when you get it
- space-flight dynamics (X-Plane comes with a rocket-propelled orbital glider... you can fly into space and do a REALISTIC re-entry and glide to landing like the shuttle! A FULL RE-ENTRY SEQUENCE is a first for PC flight simulation, like a lot of the things on this list)
- aircraft carriers (complete with catapults and arresting wires)
- force-feedback support (force-feedback joysticks available from CH Products)
- the coolest heads-up display ever — a computerized wire-frame digital elevation display is overlaid on the real terrain, allowing sight of all terrain contours and airports even in zero visibility!
- night-vision-goggle simulation
- random microburst-generated wind shear with random microburst locations.
- radio magnetic indicator
- flight-control failures!
- aural ground-proximity warning system
- day, dusk, evening, and night cockpit lighting
- landing-gear failures
- isometric plot of the regional landscape with your flightpath plotted in 3-D
- aileron trim
- weather rate-of-change control

I have loaded and run the X-plane software on two Micron computers, a laptop with a Cirrus video card and a desktop with the Diamond Stealth 3D 2000 video card. Each produces very vivid colors and the frame rates are something to be experienced (i.e. Great!) If you have become accustomed to pauses, jerkiness, slow screen "refreshes", especially just as you turn base to final approach, as are often the case in other simulation programs, you will be pleasantly surprised while flying X-Plane. X-plane is simply the smoothest and fastest screen simulation that I have ever encountered. The user may select any number of enhancements, weather scenarios, and if any of those commands cause a frame rate reduction, to a speed not desirable within the program's resident and watchful eye, a suggestion is made first to the user that he take steps to reduce his complexities, or a selection can be left into memory for automatic reduction where by the program automatically sheds them itself to restore the expected smoothness of flight.

The accompanying X-plane manual is also very unique in its presentation. I plead guilty to being very impatient with new software that requires a couple, or more, hours of reading to educate myself on what sort of keyboard commands, and how many are necessary to actually fly, before I can actually fire up an engine and take off into the wild blue of a NEC monitor. If any of that description reminds you of yourself, I certainly feel you too will appreciate this quote from Laminar's web page:

"The airplane is flown with the joystick, while the mouse is used

Figure XP.4 - View your flight path from any angle you can imagine!

to set the throttle, landing gear, frequencies, flaps and other stuff. You never have to touch the keyboard for the entire flight!"

Using the Microsoft Sidewinder Pro at my computer setup I found that the throttle control on that joystick worked quite well… so the mouse was saved for other movements.

X-plane includes several airplanes, ready to fly right out of the box. From a Boeing 737-300 to a Mooney TLS, or a Beech Baron, Beech King Air, Bell 206-B3, Cessna 172 RG, Cessna Citation, Glassair II, HawkXP on floats, Marchetti SF260, Orbital Rocket Glider, Pilatus PC-XIII, Robinson R-22, and MANY more too chose from.

A simple click on the aircraft/helicopter file puts you on the runway of your choice with a very pleasing engine sound, whether it be the whine of a turbine or the low rumble of a Lycoming at idle or the "pocta pocta" of an idling chopper. The selection of your

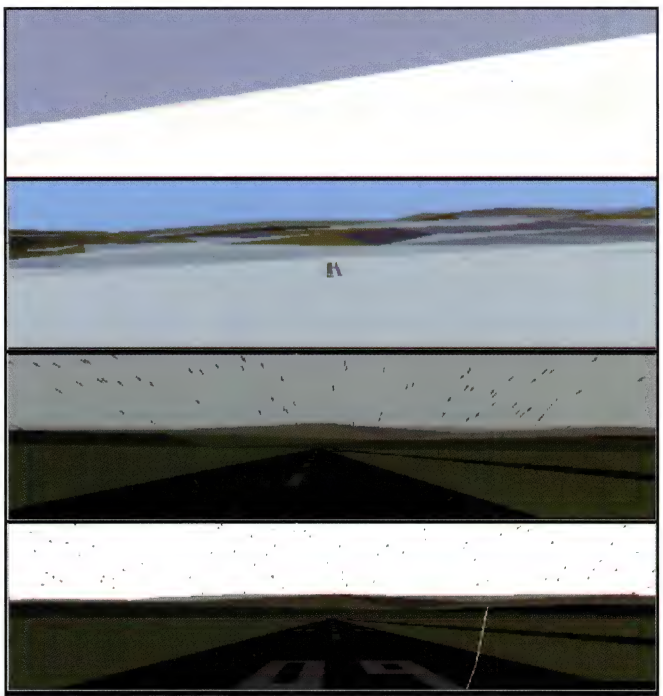


Figure XP.5 - A weatherman's dream: (top to bottom) Above the deck, a snow covered field high in the mountains, rain, and even lightning flashes!

flying area also couldn't be easier. Choices are available for Lat/Long, known airport ID's, etc., but I particularly liked the graphical map of the United States. This choice, when selected, only requires the user to place the mouse pointer on an area that interests him/her and then the simulation program offers a host of choices for airports located within that area. I selected an area an inch or so to the west of Lake Michigan. I was now in South Dakota. I was born and raised in that state and did a lot of flying around that rather sparse area of the world... lo and behold... I was able to select Aberdeen Regional, Runway 31, and after tuning in the ILS and ADF to the proper and correct frequencies I was all setup for a couple of flights around the pattern.

Using a Mooney as my first aircraft choice I was pleasantly surprised at its docile nature and more impressed with the field of depth provided by the full screen(top half above the instrument panel) view presented for out of the window type flying. I have never flown another simulator program that gave me the graphical "feel" and presence that X-Plane does. As I approached the runway in use on a left base with a 90 degree turn required to final, an intuitive feeling for just the right amount of bank angle to roll out on centerline, happened again and again. This is difficult to relate to you with words, as the old saying goes about "one-peep=one-thousand-sweeps" of the radar scope, for putting graphical pictures to your mind. However, a quick trip to the Laminar or MicroWINGS website and the downloading of a Demo version of X-plane will certainly show you what I mean. This is certainly one of the best, if not the best, man-interface graphical relationships that I have ever encountered on my computer screen when using that machine to replicate a flying machine. That may be explained in part by the obvious and numerous references in the manual that this simulation was originally designed for Apple/Macintosh computer systems. Long the leader in the computer industry for excellent graphics and user friendly access to setups, the Mac and its family certainly gain their share of praise in the text of the manual. An example follows:

NOTE FOR WINDOWS 95 USERS: If you have Microsoft Plus, you should probably remove it ! "Microsoft Plus, modifies the mouse cursor in such a way that the cursor can flicker horribly when running "Direct Draw", Microsoft's own graphics system. "X-Plane" uses 'Direct Draw", so the mouse cursor may flicker annoyingly if "Microsoft Plus" is installed. Of course Macintoshes never have these types of problems.

Of course, this Microsoft Plus user encountered exactly that problem and soon found himself removing Microsoft Plus to enable a more steady and productive mouse. I really have not missed Microsoft Plus since that time.

If you are not certain that you have the most current Direct X drivers for your system, Laminar Research provides them on the CD ROM and additionally has them on its website. I discovered that those drivers were not compatible with my Diamond Stealth card, but was relieved that a program prompt told me just that and suggested that I visit the Diamond Video site on the Web for their latest drivers. I proceeded to do that, did find some newer drivers than what I was using, downloaded them, installed them, and I was up and running with X-Plane.

I am not a builder of airplanes, especially with computer designed airplanes. However, having said that, this is the program that I would and will use to break free of those inhibitions. Plane-Maker and Parts-Maker are designed for pilots/drivers, just like me. Those two programs take the mundane and the tedious and convert them into the easy and the pleasant. Want to add a "HUD" system to your Mooney? Click on Plane-Maker, load up the Mooney airplane, click on Add HUD, save that file, click out of Plane-Maker, reload in X-plane and there on your glare-shield is a new button for the mouse. HUD ON/OFF soon finds a mouse landing on its area... and there on your windshield is a technology leap of several decades... and I did it myself!

Knowing full well that many readers of this magazine might be much more design qualified and much more interested in scratch building of their own unique airplanes... I'd like to offer you a text presentation from the X-Plane manual that more fully explains the basic concepts of this program and WHY you can build your own airplane, or modify the included aircraft so easily:

The X-Design system is based on the following principal:
You measure the dimensions of your airplane
You enter those dimensions into the computer
You fly your airplane on your desktop

X-Plane was designed to simulate aircraft by using an engineering process called "blade element analysis", a procedure frequently used by engineering companies to predict the performance of aircraft propellers and helicopter rotors. The process is actually quite simple: The propeller or rotor blade is broken down into a finite number of pieces(usually about 5 to 20), and the exact speed of each "piece" is found by considering the movement of the airplane and the rotation of the propeller. Once the speed and angle of attack of each piece of the propeller are known, the forces on the propeller can be found.

X-Plane uses this theory not just on the propeller, but on the entire aircraft. The prop, wings, horizontal stabilizer, and vertical stabilizer are each broken down into several pieces and the forces are found on each piece. These forces are then added up to give the total force on the airplane. Once the total forces on the airplane are known, X-Plane can easily determine what the airplane will do next. The flight physics of X-Plane are designed to handle compressible, but not transonic flow, so the simulation is realistic up to about Mach 0.8(a hair faster for swept-wing airplanes)

I am glad that Laminar Research printed those paragraphs for me because in the airfoil section of Part-Maker selections of Reynolds number, Coefficient of lift/drag/moment I soon was out of my element. Suffice it to say however, if you want to build an airplane... this program will do the utmost in leading you through those steps. If you only want to fly the included airplanes, and those that are offered from time to time for download from the websites, this program is also for you (and me).

For current pricing and a very excellent demo please visit the Laminar Web site at www.x-plane.com or if you are ready to experience the magic of flight and aircraft design immediately, order a copy of X-Plane, a most unique flight simulator product that will remain on this hard drive for a very long time.

About the author – Mel Ott is a 747-400 Captain for Northwest Airlines and has 32 yrs of experience flying the big birds. You can find Mel active on CompuServe's FSFORUM and he can be reached via email at 70263.53@compuserve.com. ***[MW✈]***

FROM SEA TO SHINING SEA

Cross Country at Mach 2!

MicroWINGS' Under the Hood columnist, Jonathan Stern, guided us through a challenging flight from Washington, DC to Los Angeles in the Sept/Oct (Vol.4, No.5) issue of MicroWINGS Magazine. On that adventure we piloted a USAir Boeing 757 from Washington National (DCA) to Los Angeles International (LAX). After guiding us to a safe "three bounce" landing, Captain Jonathan cleared us direct to the Malibu Chart House restaurant for an after-flight dinner.

Well, here is the rest of the story recounting my return leg of this adventure. I am always looking for a faster way of getting from point A to point B during my virtual world flight sessions. I wanted something fast for my return trip, so my first task was to select an appropriate aircraft. My need for speed lured me into the cockpit of the most exciting high performance warplane ever built, the Convair B-58 Hustler. A super sonic model of the B-58 is available commercially in TekMate's Hangar 14 "Peacekeepers of the Nuclear Age" linked through the MicroWINGS Cool Webs page at http://www.microwings.com.

The Convair B-58 first flew in 1956 as the world's first super sonic bomber. It set 14 world records by 1962 and stood on continuous alert with the Strategic Air Command (SAC) until 1969. The Hustler was powered by four General Electric J79 turbojets generating over 15,000 pounds of thrust each. With a take off speed of 190 mph, lightly loaded the Hustler could attain an astounding climb rate of 46,000 ft per minute. Standard range with in-flight refueling was approximately 7,500 miles with a cruise domain of mach 2 at 50,000 feet. In 1961, a B-58 A (59-2451) set a world record with a non-stop flight from New York to Paris in 3 hours and 19 minutes. In 1962, another B-58A (59-2458) won the Bendix and Bleriot Trophy for breaking a transcontinental speed record by flying non-stop from Los Angeles to New York in 2 hours and 56 seconds.

While planning my return leg, I elected to alter my final destination. Instead of returning to Washington, I would divert to New York. Wouldn't it be great to virtually beat the Bendix and Bleriot record time! I wanted to keep ATC instructions to a minimum so I entered my flight plan to include only one check point between LAX and JFK, Denver (DEN) VOR. I planned to track my enroute progress on my Sky Prints Chart Atlas by tuning in VOR signals near my flight path as I streaked across the Great Divide and beyond.

There are certainly some special things to consider before strapping yourself into an "airplane with an attitude" such as the B-58. In an aircraft traveling at super sonic speeds, your turning radius can easily exceed 50 miles or more, so plan turns and course corrections well ahead. The structural limitations of the B-58 are narrow at high speeds. Sudden, aggressive maneuvering will guarantee a disastrous loss of control. You will be covering about 1 mile every 3 seconds, so stay ahead of your airplane and don't miss your check points. At super sonic speeds, it doesn't take long to get way off course! When on short final for landing, approach with a slight (17 degree) nose up attitude and prepare for an incredible sink rate if you pulled back on the power prior to flaring. The Hustler has a narrow, high center of gravity on the ground roll so make sure you level the wings before touch down or you could make Jonathan's "three bouncer" look enviable.

After filing my flight plan, I converted the adventure file to FS95 format and struck out to conquer the continent in 2 hours or less. The log is not in yet on YOUR attempt, but here is a brief summary of mine:

(Logged time indicates in-flight duration and does not reflect actual time zone changes.)

17:26 Took off from LAX and cleared to FL 340 on a direct to JFK as planned.

17:33 (7 mins) Las Vegas VOR active at 77 miles DME.

17:39 (13 mins) Radar Check; FL 340, heading 050 at 1,028 knots with LAS 46 miles DME at 340 degrees, Hoover dam below.

17:46 (20 mins) Over the Grand Canyon area with Page VOR at 70 miles DME.

18:06 (40 mins) Denver VOR active at 70 miles DME.

18:15 Simulated in-flight refueling by topping off the tanks to 100%.

18:26 (1 hr) Over Pawnee City VOR at FL 340, heading 080 at 1,034 knots.

19:12 (1 hr, 46 mins) North of Harrisburg PA. at FL 340, heading 086 at 1035 knots.

19:18 (1 hr, 52 mins) Instructed to contact JFK approach on 118.8, descend to 3,000 ft.

19:20 (1 hr, 54 mins) Gear down over the outer marker and cleared to land runway 13L.

19:28 (2 hrs, 2 mins) Touched down on JFK's 13L and turned off on the first taxiway.

While the flight duration indicates I lost in my attempt to beat the Bendix Trophy record by one minute, consider that the real Bendix and Bleriot Trophy run began as a high speed over-flight of Los Angeles and ended as such over New York. With my take off, climb out, descent and approach times figured in, I didn't do to badly for a Cessna 150 weekend warrior and FS95 certainly did a great job for a desktop simulator.

Super sonic flight through Flight Simulator's stratosphere is not restricted to the B-58. TekMate offers several other aircraft that can easily exceed Mach 1. Whether you select the Concorde SST, SR-71 Blackbird, the Rockwell B-1B, or the experimental X-15 rocket plane, all the rules apply for fast flight as described for the B-58. Stepping up from fabric covered rag wings to titanium alloyed flight surfaces can be intimidating even for the most experienced throttle jockey among us, but what a rush it is, indeed, to race the sunset and win!

Flight Sim has come a long way since we all made that first long cross country from Chicago to Champaign, Ill. Today, whether attempting to break speed records across entire continents or dodging sand dunes at Kitty Hawk, each PC flight session offers enough variables for a unique adventure every time. If you accept the challenge of a record breaking transcontinental flight as described in this article, you will probably agree the experience can be virtually awesome. Explore the excitement of super sonic travel in the super scenic world of Flight Simulator and fly the cutting edge.

About the Author: Gene Lacy is a private pilot and a member of TekMate's Virtual Skunks team, designer of FS4, FS5+, and FS6 aircraft and has been an active contributor to the FS community since 1991 as owner and operator of DataWings. ***[MW✈]***

Review Of... ...AETI's Professional Flight Control System

by Michael Fisher

I caught my first glimpse of AETI's new Professional Flight Control System (PFCS) at last October's MicroWINGS conference (see V4N5 of the magazine for a review of the conference). While exploring and enjoying the many new products on display in the exhibit hall, I noticed that AETI's latest entry into the growing array of flight controls was drawing a sizeable crowd... and of course I moved in for a closer look. I couldn't have been more impressed with what I found.

The PFCS is the first professional-quality flight yoke priced for serious FS hobbyists instead of flight schools. It offers a truly realistic feel which departs sharply from the plastic-and-springs feel of leading low-cost game controls. At the same time, it uses a simple, innovative mechanism to provide authentic progressive resistance, making it far less expensive to produce — and thus, far more affordable — than other high-fidelity flight controls.

I spoke recently with AETI president Martin Arant about the yoke's development and the specific need which AETI, his Irvine, California company, is attempting to satisfy. "It is a direct result of the work I did on the VACS (Virtual Air Combat System), AETI's low-cost, motion-based, air combat cockpit simulator. I had been trying to replicate the 'feel' of flying, which is relatively easy to accomplish when you have the luxury of moving the whole thing. Personally, my own interest in flight simulation had always been in the commercial rather than the military arena, and I kept wondering whether there was some way to increase the 'feel' of flying with a hobbyist product like Microsoft Flight Simulator."

Arant concluded that "there simply was not going to be a way to build a motion platform that the average end-user FS hobbyist could afford." The logical step, he thought, was to concentrate on the yoke. "It is the primary physical interface between the pilot and the simulated aircraft." Arant noticed that yokes in real airplanes and commercial simulators "have a 'weight' to them that just isn't replicated in the plastic joysticks and yokes most of us have been using for years. There's also some latency when you move a real yoke, which results in an 'elastic' response very much unlike the feedback you get when, say, turning the steering wheel of a car. It's more like the delayed effect you get when you turn the tiller on a boat. When I sat down with the design engineer, the first and foremost requirement was 'feel.' It probably helped that his background was in building professional simulators and not with building joysticks — he approached the problem from a 'results' perspective, rather than just assuming that we would be connecting plastic to springs."

Those results are stunning. The yoke's sturdy,

molded plastic handle is bolted to a steel faceplate. The faceplate cover even includes a spring-loaded clip which you can use to hold your instrument approach charts. The faceplate is connected to a steel sleeve assembly which is mounted on a pair of ball-bearing slide rails, which in turn are attached to the yoke's heavy steel base. The front of the base bends down to form a c-clamp, which holds a pair of thumbscrews that clamp the yoke firmly to your desktop. The end result is a large, heavy yoke which travels smoothly through its entire range of motion on both axes. It measures 15" deep at neutral position by 5" wide by 4-1/2" tall, so be sure to leave enough room on your desktop for the large footprint it occupies. The full-size handle assembly is 13" wide by 7" tall by 3" deep, and the entire yoke weighs about eight pounds.

Most impressive, though, is the progressive resistance and authentic feedback the yoke provides. The afternoon before I first saw the PFCS demonstration in the MicroWINGS conference exhibit room, I had the opportunity to spend about 20 minutes in the left seat of one of Southwest Airlines' 737-300 full-motion simulators. When Arant demonstrated the yoke for me later that evening, I found it hard to tell the difference between the feel of the yoke in Southwest's professional simulator and AETI's amazing new invention. I was struck speechless when Arant lifted the cover of the prototype and showed me the resistance mechanism he and his design engineer had settled on. Arant explained, "after trying various tension systems, including even miniature hydraulic cylinders, we settled on a bungee cord for the tension and feedback mechanism. This actually did not require much of a decision, as I knew the first time I tried the prototype that it produced the results I was looking for. Quite simply, it just felt right!"

It sure does. The bungee cord — the same bundle of elastic bands enclosed in a nylon wrapping which kids use to help carry schoolbooks and which grown-up kids use when hurling themselves off bridges for expensive thrills — provides a realistic feel unlike anything I've ever experienced from mass-market, spring-based, plastic yokes. The most important benefit from its use seems to be its ability to accurately center the yoke while dispensing with spring-loaded détentes. If you've been applying some back pressure on the yoke and need to transition to forward pressure, you can do so smoothly and easily without having a spring-loaded mechanism interrupt the yoke's travel as it moves through its center position. The elimination of the détentes on both axes also means that the yoke does not require more force to start it moving than it does to keep it moving — the critical flaw which contributes to pilot-induced oscillations in low-end yokes.

I've also noticed that other low-end yokes seem to use constant rather than progressive resistance — for example, turning the yoke from the neutral position to the four o'clock position generates the same feedback as turning the yoke to the five o'clock position. The resistance the yoke transmits to your wrist, which you interpret as feedback, feels exactly the same in both cases — and can lead to over control. The bungee mechanism used in the PFCS provides true progressive resistance. The yoke's accurate feedback lets you know as soon as you apply pressure exactly how far the yoke has moved. The PFCS finally makes precision, fingertip control of your airplane possible in PC-based simulations.

The yoke is, at its core, a standard four-button joystick, and provides buttons for brakes, flaps, and gear. A rocker switch controls the yoke's unique electric trim — a small motor/transducer assembly that attenuates the signal generated from the yoke's main y-axis pot.

I've often heard it said that buying a new set of golf clubs won't improve your game one whit. But after spending the past few weeks with the PFCS, it's clear that this old saying doesn't hold true when it comes to the subject of flight controls for Flight Simulator. The PFCS provides the precision control I've long missed in Flight Simulator, and most flight maneuvers — even the more complex ones — have become much easier now that I no longer have to arm wrestle the controls.

The AETI Professional Flight Control System is available with or without optional throttle control. MicroWINGS member discounts are available. For further information, contact AETI via the information in the Commercial Member Directory near the back of the magazine. [MW✈]

PROPILOT UPDATE

As we get closer to the July release of ProPilot, we can see from the latest screen shots, just how visually appealing this sim will be. Even more screen shots can be found on the Sierra website at http://www.sierra.com/entertainment/pilot/sshots.html. You can also sign up for a mailing list (email) where Sierra will let you know all the latest about ProPilot including whenever any new information is posted on their website, etc. You can do this by pointing your web browser to http://www.sierra.com/entertainment/pilot/update.html. In the last issue, we showed you the latest panel and aerial ground screen shots. In this issue we concentrate on the out-the-window views from all around the aircraft. The screen shots are of (left to right, starting at the top): Front view in a 172, Right-Rear view in a 172, Left-Front view in a 172, Left-Front view in a V35 Bonanza, Left-Rear view in a 172, Left-Rear view in a B58 Baron, Rear view in a 172, and Rear view in a V35 Bonanza. The magazine's cover shows the Right side view in the V35 Bonanza. ***[MW✈]***

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(616)698-0325 (F)
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(714)366-9565 (V)
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Publishers of Pilot-In-Command.

Flight Computing Catalog
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(415)883-7599 (F)
Publishers of Flight Computing Catalog (a collection of aviation products, software, & apparel).

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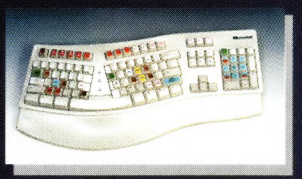

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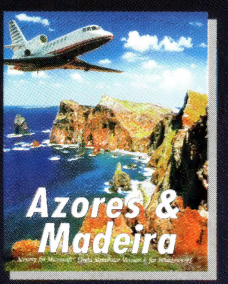

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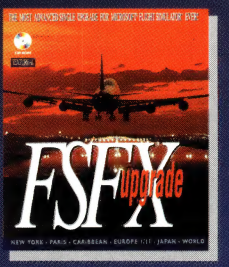

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